Vegetation Classification of the Santa Monica Mountains National Recreation Area and Environs in Ventura and Los Angeles Counties, California

Version 1—Association Level and Specific Alliances

A Report Submitted To

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INTRODUCTION

The U.S. Geological Survey (USGS) and National Park Service (NPS) formed a partnership in 1994 to map the vegetation of the United States National Park system units using The Nature Conservancy's National Vegetation Classification, a standard for reporting vegetation information among federal agencies (Grossman et al. 1998). Goals of the projects include providing baseline ecological information to resource managers in the parks; putting the data into regional and national contexts; and providing opportunities for future inventory, monitoring, and research activities. Each park developing a vegetation map follows a standardized field sampling and vegetation classification protocol to document the various vegetation types found in that park. This information is used by photointerpreters to delineate polygons of vegetation communities, which are subsequently subjected to an accuracy assessment process (USGS 1994). The final products consist of a vegetation map, descriptions of each vegetation type, a key to each type, and all related data and metadata files (original field forms, plot database, accuracy assessment points, etc.). This report presents the work at the Santa Monica Mountains National Recreation Area (NRA) (park code: SAMO) and environs conducted from 2001 to 2005.

The Santa Monica Mountains in Context

The Santa Monica Mountains are not only the most accessible and largest piece of natural land adjacent to the western Los Angeles Basin but also play an important role in the panoply of vegetation in southern coastal California. Fire history, soil differences, a variety of moisture regimes, and topography all combine to create complex patterns of woodland, chaparral, coastal scrub, and grassland vegetation. The mountains are home to several locally common but regionally restricted species (such as *Ceanothus spinosus, C. megacarpus, Eriogonum cinereum,* and *Coreopsis gigantean*), each because of its high sociability and abundance defines its own suite of vegetation types. Other alliances defined by *Encelia californica, Salvia leucophylla, Juglans californica,* and *Rhus integrifolia* are widespread in southern coastal California but display a concentrated distribution and a broader variation of vegetation associations here than anywhere else.

The Santa Monica Mountains are the westernmost and lowest of the transverse ranges of southern California. They have small stands of high-elevation chaparral alliances such as *Quercus wislizeni* var. *frutescens* and *Arctostaphylos glandulosa,* remnants of a cooler and perhaps moister climate. However, they are tall enough to sustain a more extensive presence of some higher-elevation chaparral alliances such as *Ceanothus oliganthus* and *Adenostoma sparsiflora*.

They also contain the southernmost viable stands of *Quercus lobata* woodlands in California and among the largest remaining woodlands of *Juglans californica*.

The seaward bases of the mountains have Baja, California-like succulent coastal scrub including stands of *Opuntia littoralis, O. oricola,* and *O. prolifera* along with drought deciduous scrubs including *Salvia leucophylla, Artemisia californica,* and the largely insular *Coreopsis gigantea.* The core of the mountains includes thousands of acres and varied examples of *Ceanothus spinosus* and *C. megacarpus* alliances, both representing the center of their world distribution.

Riparian vegetation includes extensive woodlands of *Platanus racemosa, Salix lasiolepis,* and *S. laevigata,* which often interface with lower slope woodlands of *Quercus agrifolia, Juglans californica,* and *Umbellularia californica*. Further south, the latter two alliances diminish significantly, thus signifying the biogeographic role of the Santa Monica Mountains as crossroads between northern and southern California coastal vegetation.

Background and Standards

The U.S. National Vegetation Classification (USNVC) applied throughout this report was developed by NatureServe in partnership with the network of State Natural Heritage Programs (under the guidance of The Nature Conservancy). Additional support was provided by federal agencies and the Ecological Society of America. A first edition of the classification has been released that provides a thorough introduction to the classification, its structure, and the list of vegetation units known in the United States as of April 1997 (Grossman et al. 1998). Refinements to the classification have been occurring in the application process, leading to ongoing proposed revisions that are reviewed both locally and nationally. These refinements are best seen using the NatureServe Web site at http://www.natureserve.org/explorer/.

Vegetation mapping in national parks has been done under the auspices of the NPS Inventory and Monitoring Program, in close cooperation with the USGS Biological Resources Division. The mapping is done in accordance with standards established by the Federal Geographic Data Committee (FGDC) for vegetation mapping on federal lands. The FGDC Web site (http://www.fgdc.gov/standards/standards_publications/index_html) explains the development of the classification standards currently used for mapping and classifying vegetation in national park. The USGS Biological Resources Division—NPS Vegetation Mapping project Web site (http://biology.usgs.gov/npsveg/standards.html) has additional information on vegetation mapping in national parks.

The development of a vegetation classification and concomitant map is a complex project. Not all vegetation types are equally mappable at a certain scale. Coordination between the vegetation classification team and the aerial photointerpreters is needed to resolve the best way to map the types, whether directly at the finest association level, at the higher-classification levels (such as at the alliance), or as a mosaic or complex. Thus, not all types described in this report are necessarily mapped directly. A separate report documents the link between the mapping and the field-based vegetation classification (AIS 2005, in preparation).

Initially in the mid 1990s, several California parks were chosen by USGS-NPS to be part of the prototype phase of the program representing different regions, environmental conditions, and vegetation types. The initial goal of the prototype phase is to "develop, test, refine, and finalize the standards and protocols" to be used during the production phase of the project. The program includes the development of a standardized vegetation classification system for each park and the establishment of photointerpretation, field sampling, and accuracy assessment procedures. Following initial projects of classification and mapping of Point Reyes National Seashore (2003), Golden Gate National Recreation Area (2003), Yosemite National Park (2003), Joshua Tree National Park (2005), and Sequoia National Park (2004), the decision to develop a map was made by SAMO staff based on (1) a desire to maintain consistency with the work done at these other parks, (2) the quality of the work performed at these parks, and (3) sufficient development and testing (proven application) of protocols and procedures.

SAMO is situated in an urban-wildland interface in the south coastal portion of Southern California. As such, it is the first national park unit to be mapped and classified in California where fire management and fuels prediction attain such a critical level. Funding for this project came largely from the NPS Fire Management Program. Results from this report and the associated vegetation map are expected to inform fire management decisions for SAMO and the adjacent areas. Because ownership is complex in the Santa Monica Mountains, the park determined that a complete classification and map of the environs of the entire area were necessary to properly deal with integrated management issues.

The area in this study covers approximately 350,000 acres and stretches from Point Mugu and the associated Mugu Lagoon tidal marsh on the west to Griffith Park in the city of Los Angeles to the east. It reaches from Point Dume and Malibu on the south to the Simi Hills and Montcleff Ridge on the north (figure 1).

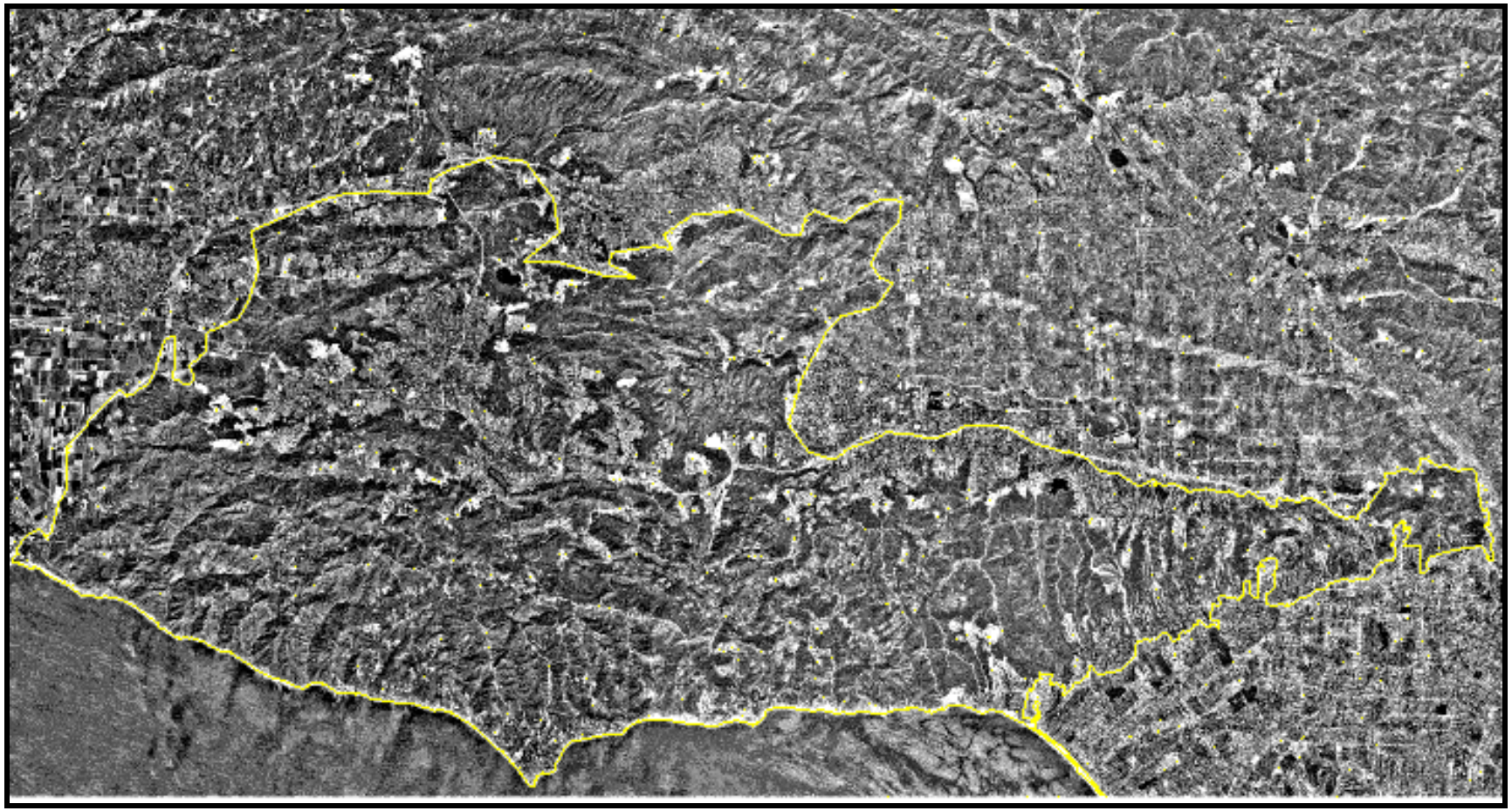


Figure 1: Shown is a SPOT 2002 satellite image of Santa Monica Mountains with the study area boundary in yellow. Note the large expanse of urban to the northeast and southeast and mix of agriculture and urban to the west and north. This image is best viewed at 300–400 percent of current scale.

The Santa Monica Mountains NRA extends 46 miles from the Hollywood Bowl to Point Mugu in Ventura County. It also runs along the coastline from the Santa Monica Pier west past Malibu. The U.S. Congress created the Santa Monica Mountains National Recreation Area in 1978 and charged NPS with supporting a shared management of the park. NPS, State Parks, and the Santa Monica Mountains Conservancy jointly administer the public parklands of the area. In the immediate vicinity of the park live approximately 17 million people.

With respect to landowners, the California State Parks is the largest landowner within the recreation area with 42,000 acres. However, approximately half the land in the recreation area is privately owned and more than 70 government entities have jurisdiction within the boundary. The city of Malibu is entirely within the park's boundary. The recreation area is approximately154,000 acres. However, in an effort to develop an ecologically realistic and managerially usefull map, more than double that area has been included in this study.

This report outlines and describes the project timeline, vegetation classification methodologies, sampling criteria, and data analysis procedures implemented in creating the final vegetation layer for SAMO. It describes the result of this classification process in terms of a formal classification list, key, and description of all vegetation types identified during this process.

Funds for this project were provided by the National Park Service Fire Management Program, National Park Service Inventory and Monitoring Program, Mountains Recreation and Conservation Authority (Santa Monica Mountains Conservancy), United States Army Corps of Engineers, and the Resource Management Agency of Ventura County. Initial funding for the project was received in 2001 and a contract was entered into with ESRI to develop a vegetation classification and map. Primary responsibility for development of the classification was assigned to Todd Keeler-Wolf (California Department of Fish and Game [CDFG], California Heritage Program senior vegetation ecologist) and Julie Evens (California Native Plant Society [CNPS] vegetation ecologist). John Tiszler served as the NPS contracting officer's technical representative and project manager. NPS assumed responsibility for field data collection, vegetation database management, and statistical analyses.

As the contract for the classification and portion of the project was developed, NPS worked with ESRI as the principal contractor and ESRI subcontracted with the California Native Plant Society via the California Heritage Program ecologist (housed at California Department of Fish and Game), representing NatureServe in California. ESRI also subcontracted with Aerial Information Systems of

Redlands, California, to produce the map driven by the classification developed by CNPS and CDFG.

The primary motivation for this project was to produce a new vegetation classification and map that meets NPS and USNVC standards and to provide the information base necessary to develop effective fire hazard management strategies while fully protecting natural resource values. In addition, we anticipate the classification and map will have many uses for the numerous public planning and land conservation agencies with jurisdiction in the Santa Monica Mountains and Simi Hills. The classification and map will provide a highly detailed spatial assessment of native vegetation and, as such, will be a valuable planning tool where habitat connectivity, sensitive vegetation types, and protection of designated Ecologically Significant Habitat Areas are of concern. The capacity to make local vegetation management and other land-use decisions will be greatly improved.

The principal needs for this mapping project were the following:

- Implement a GIS-based, gradient-directed transect (GRADSECT) approach for sampling.

- Integrate the vegetation sampling process with the photointerpretation process so a seamless, mutually beneficial feedback loop would develop, with the field crews providing information to the mapping team at the same time mappers would be supporting decisions by field crews about where and what to sample.

- Integrate any existing or ongoing vegetation data with the necessary field data to be collected during this project into a unified vegetation classification that would be used for the final vegetation description and vegetation mapping products.

- Work with the unique characteristics of a chaparral and coastal sage scrub and develop the best methods for detailed classification and mapping of this vegetation.

- Work within a complex urban-wildland area surrounded on all sides by major population centers to develop a detailed classification and map that would address many key issues of urban-wildland vegetation management.

The scientific purpose of developing the classification for the area to be mapped was to integrate a large amount of new information into California's vegetation

classification and USNVC. This report provides the basis to achieve that goal. By standardizing the reporting structure of each new classification unit, NatureServe will be able to integrate this information into the national vegetation classification.

This project was the first effort to extensively employ the CNPS Rapid Assessment Vegetation Sampling Protocol, as seen through the following link: http://www.cnps.org/programs/vegetation/protocol.htm. This technique was selected in addition to the standard accuracy assessment sampling protocol and the relevé sampling protocol used regularly by the National Park vegetation program because of its ability to represent large numbers of vegetation stands quickly, thus increasing the sample size and range of sampling locations for all types of vegetation. The rapid assessment protocol was expected to be an efficient way to inventory many dense and difficult to penetrate stands of chaparral and coastal scrub, where the species indicative of particular ecological settings are primarily in the shrub layer and not in the understory herb and grass layer. It was used extensively in virtually all types of vegetation in this project except for the species-rich riparian, oak, and other hardwood woodlands; coastal sage scrub; and grasslands in which releves were used to augment the samples. The diversity of species and the more significant variation of understory species in these situations require a full sample of all species present to more accurately classify and understand the variations in these types of vegetation. For a thorough explanation of the protocol see appendix 1.

NPS Field Crew and Supporting Staff

Five crew members were hired or reassigned by the park in the summer of 2003. They were James Anderson, Rachel Buchwalter, Julie Christian, Charles Hohn, and Mike McGraw. Park staff Brendan Clark and Tarja Sagar also assisted with surveys on an intermittent basis. Christian served as crew leader and was responsible for scheduling and assignment of all field and laboratory activities. Buchwalter left the project in 2003, and the crew continued as four members with intermittent staff support until field sampling was completed. In total, more than 6,700 vegetation stands were visited to obtain information necessary for classification and photointerpreter training.

Christian was responsible for management of the vegetation databases including data quality assurance and control. She maintained and updated the metadata that recorded changes to the evolving classification. She also organized data into formats suitable for statistical analysis. Park GIS analyst Robert Taylor performed the statistical analyses with support from Christian.

Timeline

2001

From June 18–20, an initial reconnaissance of the SAMO area was conducted by the CDFG state ecologist and the principal ecologist of the park. An initial classification list was developed following that meeting. Aerial photography was acquired in July 2001.

On November 8, a meeting was held at SAMO to bring together the project team members from the NatureServe, ESRI, AIS, and CDFG as well as other outside participants knowledgeable in the vegetation of the Santa Monica Mountains. This meeting focused primarily on discussing the Vegetation Inventory and Mapping Program, existing park data, logistics, and park-specific issues. A general overview of the project and processes involved was outlined.

2002

In February, the CDFG state ecologist met with the SAMO GIS staff to begin developing a gradient-directed approach to identifying initial sampling and mapping areas in the park. This work was continued through mid-March by the SAMO GIS staff.

Beginning in March, reconnaissance trips including the photointerpreters from AIS, park ecologists, and CDFG state ecologist began. These were two- to three-day trips that were intended to augment the preliminary vegetation classification and familiarize the air photointerpreters with the vegetation of the region. Each trip focused on a separate portion of the study area.

The second reconnaissance trip was conducted from April 22–24, followed by the subsequent revision of the preliminary classification. The CNPS vegetation ecologist joined the team of AIS, CDFG state ecologist, and the SAMO field team and associated park ecologists. The third reconnaissance trip was conducted in June and consisted of the same members.

The vegetation sampling field crew was hired in July 2002 and served through completion of the vegetation classification in January 2005. Training of crews in the use of the rapid assessment sampling protocol was conducted in July by the CDFG state ecologist and assistant ecologist, Diana Hickson.

The fourth reconnaissance trip was conducted in early September, followed by subsequent revision of the preliminary classification. Training for releve and accuracy assessment sampling protocols was conducted in early December.

2003

In March, the fifth reconnaissance trip was conducted, followed by subsequent revision of the preliminary classification.

In July, the first intensive analysis of 11 months (1,807 individual samples) of rapid assessment plots was conducted. Data was prepared by Julie Christian, and initial TWINSPAN and cluster analyses were run by Robert Taylor with assistance from Julie Evens and Todd Keeler-Wolf. Three days of intensive analysis were conducted by this group with assistance in local interpretation by all members of the field crew. Following this classification, a meeting with the photointerpreters was held to translate the vegetation classification to an updated mapping classification.

In August, a revised classification list was produced using the existing and newly adjusted recommended sample sizes of vegetation types to fully represent the vegetation categories established and assumed to occur.

In the last five months of 2003 and the first few months of 2004, vegetation data collection emphasized more accuracy assessment and releve samples.

2004

In June, an intensive analysis of the full dataset of 3,790 rapid assessments, accuracy assessments, and 122 releves was undertaken in a meeting between CDFG, CNPS, and SAMO ecologists. Prior to the meeting, Taylor and Christian undertook the data preparation and initial cluster analysis runs for the rapid assessment data, and CNPS ecologists Klein and Evens undertook the analysis for the relevé data. This analysis meeting was followed by several more days of intensive analysis by CDFG and CNPS to produce the full classification. In November and December, this classification was simplified and some initial types were reduced to synonymy or subcategories of associations called phases, with consulatation with Gwen Kittel, NatureServe's regional ecologist.

2005

In January, the classification was finalized, and description format was decided upon by all of the collaborators. Descriptions were begun by CNPS with assistance from NatureServe (and Nature Conservancy subcontractor) and CDFG. In April, all initial description data was summarized.

In June, all full descriptions were written and submitted for review, and in July to December 2005, the report was reviewed by SAMO staff and finalized January 2006.

METHODS

Gradient-Directed Sample Allocation

To strategically assess the vegetation of the area, an interactive process was developed between the SAMO field sampling team and the aerial photointerpreters at AIS. This revolved around the selection of individual subareas centered on 180 aerial photos at 1:12,000 scale from the study area. Each of these subareas was selected through a GIS analysis of the environmental variables thought to drive the distribution of the principal vegetation types in the area. Denise Kamradt and Robert Taylor of SAMO and Todd Keeler-Wolf of CDFG met and developed the criteria based on a combination of geologic, precipitation, temperature, and solar insolation (based on slope and aspect) information available in the SAMO GIS files. Specifically the process included three main components:

1. Classifiying a March solar radiation layer into three classes. A 900-meter grid was created over the study area with all grid cells that did not contain all three solar radiation classes removed. This is the radiation_variety grid.

2. Classifiying and combining layers for (a) fire history, (b) geology, (c) average annual precipitation, and (d) average maximum July temperature.

   The resulting layer was a raster with a 30-meter cell that was modified in the following way:

   - Masked out cells that were not on public land
   - Masked out cells that fell within the larger 900-meter radiation_variety, where not all three solar radiation categories were represented

3. From the resulting layer, a list of all unique combinations of the four input layers was developed and modified in the following way:

   - Masked out cells for unique combinations with fewer than 900 cells each
   - Converted grid to point layer

The result is the GRADSECT layer. From the GRADSECT layer, one point was randomly selected for each unique combination of the four input layers.The result was a table of 93 "GRADSECT" points. These points became the core of initial sample selection for the field crew and also were expanded upon for further sampling later in the field seasons of 2002 and 2003. Broader interpretation of the environmental variables developed from the GRADSECT analysis resulted in the development of an ecological subregionalization of the study area.

The first cut of climate and geology produced a total of seven general subregions (figure 2). These regions are briefly described below. The photointerpretation team selected 180 aerial photographs that were considered representative of each of these subregions. For each of 180 aerial photos selected as the first phase of development, a number of possible sampling locations in parklands were selected representing the range of environmental conditions found in the analysis.

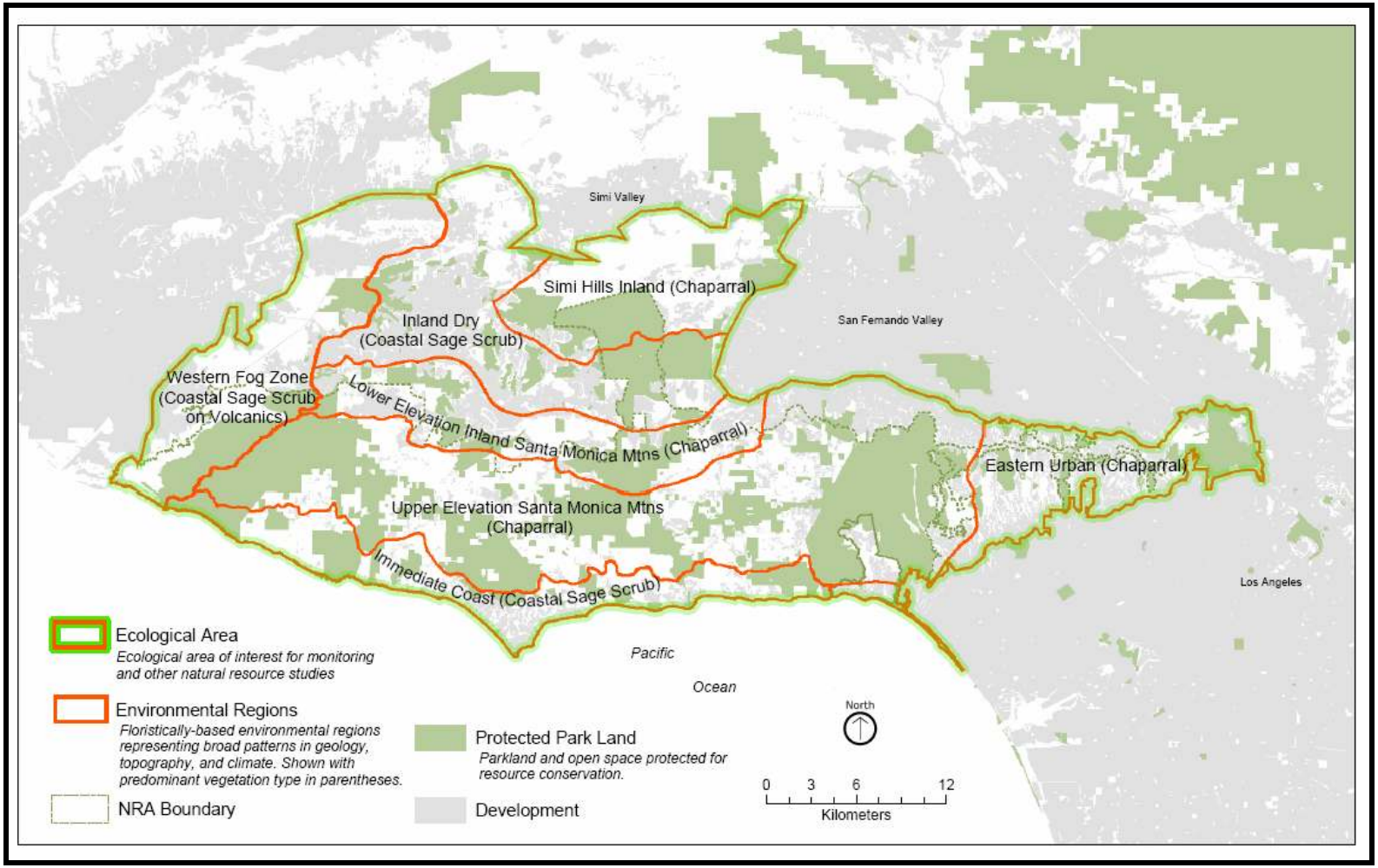

Simi Valley
Simi Hills Inland (Chaparral)
Inland Dry
(Coastal Sage Scrub)
San Fernando Valley
Western Fog Zone
(Coastal Sage Scrub
on Volcanics)
Lower Elevation Inland Santa Monica Mtns (Chaparral)
Eastern Urban (Chaparral)
Upper Elevation Santa Monica Mtns
(Chaparral)
Immediate Coast (Coastal Sage Scrub)
Los Angeles
Pacific
Ocean
Ecological Area
Ecological area of interest for monitoring and other natural resource studies
Environmental Regions
Floristically-based environmental regions representing broad patterns in geology, topography, and climate. Shown with predominant vegetation type in parentheses.
NRA Boundary
Protected Park Land
Parkland and open space protected for resource conservation.
Development
North
0 3 6 12
Kilometers

Figure 2. Ecological Regions Identified for Vegetation Assessment

The following descriptions serve as brief characterizations of each of these seven regions.

Region 1

Title: Western Fog Zone (CSS on Volcanics)
General Location: Far West End of Range as Hits Oxnard Plain
Ave-Hi/Low Summer Temp: (Camarillo) 75/55
Ave-Hi/Low Winter Temp: 65/45, Records Below 32
Fog Description: Often Foggy, Possible Year-Round
Precipitation: 10–15", Lower than Region 2
Geology: Igneous > Quaternary >> Low Sedimentary
Soil: Incomplete, Coastal Sage > Igneous Chaparral
Elevation Range: 0–1800'

Region 2

Title: Immediate Coast (CSS)
General Location: East-West Band along Immediate Coast, South-Facing Slope of Mountains
Ave-Hi/Low Summer Temp: (Malibu) 70/60
Ave-Hi/Low Winter Temp: 65/50, No Record Lows Below 32
Fog Description: Often Foggy, Possible Year-Round
Precipitation: 15–18", Higher than Region 1
Geology: Sedimentary >> Quaternary ~ Igneous
Soil: Coastal Sage > Sedimentary Chaparral > Coastal Terrace > Sandstone Chamise/Chaparral > Igneous Chaparral
Elevation Range: 0–1500'

Region 3

Title: Upper Elevation Santa Monica Mountains (Chaparral)
General Location: South-Facing Slope of Mountains, Mid to Top
Ave-Hi/Low Summer Temp:
Ave-Hi/Low Winter Temp:
Fog Description: Mostly Spring
Precipitation: 18–23", 28" at Highest Elevations
Geology: Sedimentary > Igneous >> Quaternary
Soil: Sedimentary Chaparral ~ Sandstone Chamise/Chaparral ~ Igneous Chaparral
Elevation Range: 1000–3100'

Region 4

Title: Lower Elevation Inland Santa Monica Mountains (Chaparral)
General Location: North-Facing Slope of Mountains, Mid-Lower
Ave-Hi/Low Summer Temp: (Newbury Park) 80/50, Record Highs in 100s
Ave-Hi/Low Winter Temp: 70/40, Record Lows in Lower 20s
Fog Description: Usually in Spring
Precipitation: 18"
Geology: Igneous > Sedimentary > Quaternary
Soil: Incomplete, Igneous Chaparral > Marine Sedimentary >> Coastal Terrace
Elevation Range: 1000–2000'

Region 5

Title: Inland Dry (CSS)
General Location: South-Facing Slope of Simi Hills, Lower Slope
Ave-Hi/Low Summer Temp: (Thousand Oaks + Moorpark) 90/55, Record Highs in 110s
Ave-Hi/Low Winter Temp: 70/40, Record Lows in 20s (Moorpark is a bit more mild.)
Fog Description: Spring Only
Precipitation: 13–18"
Geology: Sedimentary > Quaternary > Igneous
Soil: Incomplete, Marine Sedimentary
Elevation Range: 900–1800'

Region 6

Title: Simi Hills Inland (Chaparral)
General Location: Simi Hills, Mid to Top Slope
Ave-Hi/Low Summer Temp:
Ave-Hi/Low Winter Temp:
Fog Description: Spring, Early Summer
Precipitation: 18"
Geology: Almost Exclusively Sedimentary >>> Igneous = Quaternary
Soil: Incomplete, Marine Sedimentary
Elevation Range: 900–2400'

Region7

Title: Eastern Urban (Chaparral)
General Location: Far East, Urban
Ave-Hi/Low Summer Temp: (Beverly Hills) 75/60, Record Highs in 100s

Ave-Hi/Low Winter Temp: 65/50, Record Lows in Mid 30s
Fog Description: Unknown
Precipitation: 18–22"
Geology: Sedimentary > Igneous > Metamorphic >> Quaternary
Soil: Incomplete, Sedimentary Chaparral/Urban Land, Urban Land
Elevation Range: 400–1750'

Sources used to define these regions include the following:

Precipitation

This layer represents lines of equal rainfall (isohyets) based on long-term mean annual precipitation data compiled from USGS, California Department of Water Resources, and California Division of Mines map and information sources. Source maps are based primarily on U.S. Weather Service (USWS) data for approximately 800 precipitation stations. In the Los Angeles and San Francisco Bay areas, the USWS data has been supplemented by county and local agency precipitation data. The data was collected over a 60-year period (1900-1960). Minimum mapping unit is 1,000+ acres. The isohyetal contour intervals differ because of the degree of variation of annual precipitation with horizontal distance.

Geology

Existing USGS digital ArcInfo coverages were downloaded from the Southern California Aerial Mapping Project (SCAMP) subheading on the Western Region Digital Geologic home page (http://geology.wr.usgs.gov/wgmt/scamp/la/laquad.html) and imported into ArcInfo. Each quadrangle on the SCAMP page has separate digital data layers available describing the bedrock and superficial geology, structural geology, and paleontological resources of the area. Only bedrock and superficial geologic information was acquired and processed by the National Park Service.

Soil

1970, USDA Soil Conservation Service, "Soil Survey, Ventura Area, California"
1967, USDA Soil Conservation Service, "Soils of the Malibu Area, California"

Temperature
www.weather.com

Within each of these seven regions, a representative proportion of the total 180 photos was selected based on the aerial extent and ecological diversity of each

subregion. Within each of the areas covered by these individual air photos, a random selection of points was made that focused on the variety of solar insolation settings within them. These points were given to the field crews as a set of possible choices to visit for individual field sampling. All selected sample locations were restricted to parkland.

Field Sampling

A preliminary classification was developed (see Existing Literature Review section below) following the reconnaissance trips and given to the Park vegetation sampling crew to assist them in identifying individual stands for rapid assessment or releve sampling. This classification list was used in conjunction with the ongoing photointerpretation work by the photointerpretation contractor, Aerial Information Systems. The interplay between the photointerpreters and the field crew included requests by AIS for field identification of representative photo signatures. These were accomplished in either rapid assessment or less complete reconnaissance-level field checks, where the main species and the preliminary classification name of individual stands were delivered to AIS. The data sharing between the field crews and the photointerpreters was one of the key points in this vegetation mapping effort. Compared to earlier National Park mapping efforts in California, it attained much higher levels of refinement and cooperation.

Field crews relied on the photointerpreters for preliminary delineations to assist them in targeting stands to be sampled. Thus, as individual aerial photos were delineated and labeled, field crews would focus on a particular aerial photo to field check, dividing their efforts between rapid assessment, releve, reconnaissance and, as the process ramped-up in the later phases of fieldwork, more accuracy assessment fieldwork. The latter sampling was done and then withheld from the photointerpreters until the completion of their work to apply a nonbiased way to test the accuracy of their work. More detailed descriptions of this process may be found in the final report by the photointerpreters.

Vegetation Sampling and Classification

Existing Literature Review

Beginning in early April 2003, information from a California vegetation classification (Sawyer and Keeler-Wolf 1995), recent classifications for adjacent areas of southern California (CDFG 1998, Borchert et al. 2004, then in draft form, Gordon and White 1994), and other existing literature were reviewed to obtain a current view of the local vegetation with respect to the National Vegetation Classification (Grossman et al. 1998). This information was compiled into a

preliminary, floristic classification of vegetation at the alliance and association levels. Further, the initial reconnaissance of the study area supplemented this classification. The initial inventory included nearly 100 associations and suggested about 150 alliances in the mapping area.

Data Analysis Process

The sample dataset used for the classification included 3,790 vegetation rapid assessments, which were completed year-round from July 2002 to April 2004, and 122 releve samples, which were completed in the phenologically active periods of spring and summer from February to June 2003. The very large number of samples collected for this project far exceeded any previous study for a given National Park unit. Thus, special techniques were employed to analyze the data. This included an intermediate analysis that informed and refocused the final phase of data collection.

In June 2003, following the first full season of data collection, 1,807 rapid assessment samples were analyzed. This involved three intensive days of progressive fragmentation of cluster analysis and individual plot-by-plot inspection of the results. In addition to Julie Evens and Todd Keeler-Wolf, data analysis was assisted and or performed by Robert Taylor of SAMO, who initially ran the data through TWINSPAN and cluster analysis, and Julie Christian, who performed queries in MS Access to summarize the data and facilitate its interpretation. The 1,807 samples were broken into seven major groups based on their broad relationships within cluster analysis. Each of these major groups was further analyzed, and preliminary association names were revised or substantiated for many of these groups. Following this analysis, it was also possible to review the entire preliminary classification and determine how many samples had been collected for each of the types, and conversely, how many more samples needed to be collected for remaining types not yet adequately sampled.

One year later, more than twice as many samples had been collected by the field crews. Another classification marathon for one week was set up, where the principal data analysis personnel reconvened to analyze approximately 3,915 vegetation samples. In addition to Evens and Keeler-Wolf, Anne Klein, CNPS vegetation ecologist, was employed to assist in the analysis. A similar process was conducted including individual analysis of each plot after they had been divided into progressively smaller and smaller groups based on cluster analysis. A database was built by Christian specifically for tracking the classification results. In this session, approximately 90 percent of the samples were assigned to vegetation types defined by their relationships and similarities.

Following this meeting, another meeting to refine the classification and define the classification units in terms of mapping units for AIS was held at the AIS office in Redlands. The translation of vegetation units to mappable units was largely accomplished. However, additional refinement was needed to finalize the classification.

Keeler-Wolf, Klein, and Evens (the classification team) continued to refine the classification in the fall of 2004. They refined the classification and adjusted some of the finer cluster units of the analysis, proposing that some be aggregated into larger units instead of remaining individual associations. Several detailed meetings of the SAMO ecologists and the CNPS and CDFG ecologists ensued, also involving the regional NatureServe ecologists. In December 2004, a final classification was agreed upon enabling the formal description writing and key development associated with this report.

Cluster Analyses for Vegetation Classification

Following the 2002–2003 sampling effort by the field staff, the rapid assessment and releve data were statistically analyzed. The classification team worked with Robert Taylor and Julie Christian from the SAMO team to classify the data. The analysis was undertaken using the PC-ORD software suite of classification and ordination tools (McCune and Mefford 1997). PC-ORD performs multivariate analyses to place vegetation plot samples into a formalized classification of community types. Using programs such as TWINSPAN (Hill 1979), cluster analysis, and ordination (McCune and Mefford 1997), groups are defined by similarities in species composition and abundance. Since plant community datasets are inherently complex and more than one environmental axis determines the heterogeneity in plant patterns, a hierarchical agglomerative cluster analysis technique was employed with Sorenson distance and flexible beta linkage method at -0.25 (McCune and Grace 2002). The cluster analysis technique was based on abundance (cover) values converted to seven different classes using the following modified Braun-Blanquet (1932/1951) cover categories: 1 = < 1%, 2 = 1–5%, 3 = > 5–15%, 4 = > 15–25%, 5 = > 25–50%, 6 = > 50–75%, 7 = > 75%. The majority of the species values fell within the first four cover classes. Prior to these analyses, data was screened for outliers (extreme values of sampled stands or species), and these outliers were removed to reduce heterogeneity and increase normality in the dataset. Samples that were more than three standard deviations away from the mean were removed using outlier analysis in PC-ORD, and species that were in fewer than three samples were removed.

Because of the size and heterogeneity of the initial dataset, a first-order cluster analysis was used to partition the dataset into more manageable subsets. Thus, the main dataset was broken into distinct, smaller subsets of around 100–200 samples, and these smaller subsets were then individually analyzed by 2–3 teams of ecologists. Subsets of individual smaller cluster groupings usually included distinctly different vegetation types or habitats. A cluster analysis was run separately for the releve data because the species data was collected differently for the releve than for the rapid assessment method (i.e., data on all species found in defined plots for relevés as compared to data on the 10–20 main species found in stands for the other assessments).

After the cluster analyses, Indicator Species Analysis (ISA) was employed to decide objectively what group level(s) to "cut" from the dendrogram and explicitly interpret the groups. Further, ISA was used to designate species that indicate the different groups. ISA produced indicator values for each species in each of the groups within the dendrogram, and these species were tested for statistical significance using a Monte Carlo technique (Dufrene and Legendre 1997). In this case, indicator species with the highest values are the ones that show the highest fidelity for a particular cluster grouping. To attain a high-indicator value, they may be strongly dominant in a particular group or they may be just present consistently in low cover in a group. In general, species with low-indicator values are found commonly in multiple groups and are restricted to none.

For the rapid assessment and accuracy assessment dataset, ISA was repeated at group levels 100 and 250. Group level 100 represents a more generalized view (e.g., indicating only 100 groupings for all of the samples) while group level 250 is a more detailed view of the way all samples are arranged into 250 clusters of related stands. These analyses were evaluated to the total number of significant indicator species (p-value ≤ 0.5) within each group level and the mean p-value for all species. The group level that had the highest number of significant indicators and lowest overall mean p-value was selected for the final evaluations of the community classification (McCune and Grace 2002). At this grouping level, plant community names within floristic classes were applied to the samples of the different groups.

Naming conventions followed the floristic units of "associations," as defined by the National Vegetation Classification System (Grossman et al. 1998) and the California Native Plant Society (Sawyer and Keeler-Wolf 1995). An association is defined by a group of samples that have similar dominant and characteristic species in the overstory and other important and indicator species, whereby these species are distinctive for a particular environmental setting. Further, significant indicator species were drawn from the analysis and applied to the associations. A set of similar associations are grouped hierarchically to the next

level in the classification, the alliance defined as the basic, generic unit of floristic classification, usually by the dominant and/or characteristic plant species in the upper layer of vegetation. For example, different types of coast live oak woodland are classified to the association level depending on the characteristic overstory and understory species (e.g., Coast live oak/Chamise as opposed to Coast live oak/Scrub oak), while there is a coast live oak alliance based on the characteristic presence of coast live oak in the overstory.

The environmental field data collected on rapid assessment surveys is basic and tends to focus on general "hard" variables such as elevation, slope, aspect, soil texture, geology, and so forth (see the protocol in appendix 1).

Associations are usually differentiated by environmental factors as well as floristic characteristics. In vegetation, the arrangement of certain groups of species defining a category of vegetation correlates with a particular set of ecological situations, which may include "hard" or specific climatic and other environmental differences related to temperature, moisture, or soil nutrition; however, it may also imply more vague ecological characteristics such as modes, frequency, and intensity of disturbance. The environmental field data collected on rapid assessment and releve surveys is basic and tends to focus on general "hard" variables such as elevation, slope, aspect, soil texture, geology, and so forth (see the protocols in appendix 1). As definitions were developed, the data analysis team used the correlates to ascertain environmental variables, or lack thereof, to help determine whether or not a particular cluster grouping should be ranked as an association.

These environmental correlates were summarized following the species cluster analysis and are reported for each of the final definitions in this report. As many of the vegetation types defined in this report related to the "softer" variables that may be correlated with successional history following fire or other disturbance, it was difficult to draw specific, strong environmental correlations with many of the types. However, anecdotal comments in the descriptions focus on these when appropriate In cases where there was a group of vegetation samples that appeared somewhat floristically distinct but shared the same environmental characteristics with a larger group of samples, the term "phase" was used. A phase is an informal unit of classification that accommodates local floristic variation that tends to not have obvious correlations with certain environmental conditions, and it is best considered a part of a more definitive association. It probably results from very localized variation in the climate or site history, resulting from local relief, soil texture, geology, fire history, and so forth.

Each sample was revisited within the context of the cluster to which it had been assigned to quantitatively define membership rules for each association. The

membership rules were defined by species constancy, indicator species, and species cover values. Upon revisiting each sample, a few samples were found to be misclassified in earlier fusions of the cluster analysis, and these samples were reclassified based on the membership rules. The set of data collected throughout the study area was used as the principal means for defining the association composition and membership rules; however, existing classifications and floras were consulted to locate analogous/similar classifications or descriptions of vegetation. A summary of the analysis process is provided in the following steps.

1. Screen all sample-by-species data for outliers. Samples (each releve or rapid assessment was considered a "sample") that were more than three standard deviations away from the mean were removed, and species that were in fewer than three samples were removed.

2. Run presence-absence cluster analysis to determine general arrangement of samples.

3. Run cover category cluster analysis to display a more specific arrangement of samples based on species presence and abundance.

4. Run Indicator Species Analysis at each of the successive group levels in the cluster analysis output from two groups up to the maximum number of groups (all groups have at least 2 samples).

5. Settle on the final representative grouping level of each cluster analysis to use in the preliminary labeling.

6. Preliminarily label alliance and association for each of the samples and denote indicator species from the Indicator Species Analysis.

7. Develop decision rules for each association and alliance based on most conservative group membership possibilities based on review of species cover on a sample-by-sample basis.

8. Relabel final alliance for each sample and arrange in table of database.

9. Use decision rules developed in the new data to assign alliance and association names to all analyzed data and all outlier samples removed from the dataset.

Some rare vegetation types were underrepresented in the sampling effort. They were often the only representatives of rare alliances known from areas within the

study boundaries, or they were the only representatives of alliances that occur in other areas beyond the study boundaries in California. In addition, it was not possible to survey the full spectrum of vegetation because the study area had mixed ownership and accessibility. For these reasons, adequate data may not be available in this report for all vegetation types. However, any relatively unique samples are considered important and are described separately in the results. In some cases, they represent unusual species groupings not described but were viewed as affording perspective into unusual vegetation types that deserve additional sampling. These types are either described at a more generic alliance/habitat level or as unique stands.

Classification and Key

The classification and key were produced to identify all vegetation types detected in the fieldwork for this project. They are based on the standard floristic hierarchy of the U.S. National Vegetation Classification as supported by NatureServe (see www.natureserve.org or NatureServe 2004). They are based on species composition, abundance, and habitat/environment.

The key provides general choices and information on the physiognomy of the vegetation and the different environments based on wetland/upland position. This approach in the key was chosen to (1) reduce the length and redundancy that is common in dichotomous keys and (2) be a guide that can be easily used by nonbotanists/plant ecologists. The vegetation key can be used as a guide to the descriptions of vegetation within this report. It is written from two perspectives: (1) a field team attempting to identify vegetation and (2) an office team attempting to place field samples into the proper category. Thus, heavy reliance is placed on correct identification of characteristic plant species and of estimation of cover of these species.

The key is first broken into major units based on dominant plant life-form: trees, shrubs, and herbs. Within these groups, the key is further divided by coniferous/ broadleaf evergreen, chaparral/soft-leaved shrubs, wetland/upland distinctions, graminoid/forb distinctions, and so forth. The key and descriptions hopefully will afford further refinement to the understanding of the Santa Monica Mountains area and surrounding regions from the standpoint of both classification and mapping.

Philosophy of Vegetation Classification in This Report

The developing philosophy of vegetation classification in California has benefited a large number of recent classification projects centered in southern coastal California (DeSimone and Burk 1992, Gordon and White 1994, White et al. 1994,

Borchert et al. 2004, Evens and San 2005, Klein and Evens 2005). These, in conjunction with a growing understanding of statewide vegetation, have enabled the classification of the vegetation in the current project to proceed within a broader and better framework than would have been possible as little as five years ago. The natural development of most taxonomies, whether they be of species or vegetation, work their way through what can be called an expansive phase and then a synthetic phase. The first is characterized by the proliferation of many taxa based on local description without the benefit of broad comparison of related types. The second is based on a retrospective and broader view of more studies where related taxa can be compared and often shown to be related, thus ultimately synonymized. This latter phase has begun to take place in much of California, especially with the preparation of the second edition of the *Manual of California Vegetation* (Sawyer et al. 2006 MS).

For example, chaparral alliances defined in previous studies included several mixed species types including *Eriogonum fasciculatum-Encelia farinosa* (Gordon and White 1994)*, Ceanothus megacarpus-Cercocarpus betuloides* (Borchert et al. 2004), and *Ceanothus megacarpus-Rhamnus ilicifolia* (Borchert et al. 2004). These were named by the characteristic codominance of shrub species and were thought initially to represent fundamentally different entities than stands of vegetation dominated singly by individual species, for example, *Encelia farinosa* (without significant cover of *Eriogonum fasciculatum*) or *Ceanothus megacarpus* (without significant cover of *Cercocarpus betuloides*). However, now with a broader regional perspective, it is becoming clear that these entities are really more generally defined by the presence of a single characteristic species that may or may not have shared dominance with a less characteristic species. In the above examples, *E. fasciculatum-E. farinosa* has been subsumed under the *E. farinosa* Alliance, the *C. megacarpus-C. betuloides* Alliance has been subsumed under the *C. megacarpus* Alliance, and the *Ceanothus megacarpus-Rhamnus ilicifolia* Alliance has been subsumed under the *C. megacarpus* Alliance.

There are various lines of reasoning used to make these decisions. However, central to most of them are a broader understanding of the geographic distribution and internal variation of each of the associations defined within these alliances. If a single mixed alliance has been named, it would have to have a broad regional distribution of the codominant species with further subregional variations of the associations to be substantiated as a codominant alliance. One example of this is the *Artemisia californica–Eriogonum fasciculatum* Alliance, which occurs from San Diego County and northwestern Baja, north to the Diablo Range of Alameda County in California.

One of the great benefits of collecting so many samples of vegetation stands in this current project is that we can now see a more complete approximation in the range of cover of species and environmental conditions for each alliance and association. Thus, we have a better sense of where the important "breaks" in species composition are in these patterns. We can also compare similar vegetation samples from other similar areas away from the Santa Monica Mountains and determine if the characteristics are indeed different or the same. Using these kinds of comparisons for many parts of southern California, we have begun to synthesize some of the complicated patterns that were first described from earlier quantitative efforts and, in some cases, simplify them.

Thus, although *Salvia leucophylla* forms single species dominant stands and codominant stands with *Artemisia californica* in the Santa Monica Mountains, we now believe that both of these situations can be encapsulated within the *Salvia leucophylla* Alliance, rather than establishing a separate alliance for the single dominant and codominant situations. This is a result of *Salvia leucophylla* being relatively geographically restricted, whereby it only dominates in the "Ventura" coastal scrub zone between Santa Barbara and Orange counties (Westman 1981 and Malanson 1984). When *S. leucophylla* makes up an important component of the shrub cover, whether it is the dominant species or is codominant with another species, it is sufficient to define the alliance. On the other hand, a mixed alliance such as *Artemisia californica-Salvia mellifera* has a much broader distribution up and down the California coast ranges and into Baja California. It occurs under different ecological conditions than either the single species alliances *Salvia mellifera* or *Artemisia californica.* For example, in the central coast ranges, there is an association of *A. californica-S. mellifera* defined by codominance of the two shrubs (Evens and San 2004). This same association is also defined for western Riverside County (Klein and Evens 2005) and Orange County (DeSimone and Burke 1992). The wide-ranging consistency of this vegetation is a strong factor in maintaining it as a separate entity from either the *Artemisia californica* or the *Salvia mellifera* Alliance.

The philosophy of this report is consistent with others that have been written for other national parks in California. We require a relatively large number of samples to set high confidence for the existence of an association. In general, we have accepted n = 10 or more as a threshold for high confidence. Any less would set lower confidence, unless the same characteristics of species composition and environmental variables have been previously well-defined in studies elsewhere.

Further revisions are bound to occur in the California state classification as more data is analyzed and compared. As a result of the relatively rigorous definitions at the association level upheld to begin with, it is likely that these modifications

will be made at the alliance level. The associations that are defined currently in this report are well substantiated by large sample sizes with consistent species compositions and relative cover values. The separation of associations into different alliances would only be reasonable if we saw major environmental differences in these alliances. Further revisions could also occur as datasets from different regions are analyzed together to identify and differentiate major environmental patterns of the alliances.

One further refinement of classification rules realized in this project was the treatment of large "emergent" shrubs. In earlier efforts in the California deserts and desert transition areas (Keeler-Wolf et al. 1998 and Thomas et al. 2004), tall shrubs or "dwarf trees," such as *Juniperus californica, Rhus ovata, Cercidium (Parkinsonia) florida, Olneya tesota*, and others, were emphasized in numerical classification when they occurred in association with shorter-statured drought-deciduous desert and semidesert shrubs such as *Encelia farinosa, Salvia apiana, Viguiera parishii,* and *Eriogonum fasciculatum*. Thus, despite a possible higher overall cover of individuals of the shorter drought-deciduous species, the larger, evenly spaced emergent species were found to "drive" the classification by their presence rather than by their total percent cover in a stand. This meant alliances and associations were often named by the larger, less dense emergent species.

Structurally similar situations exist in the Santa Monica Mountains where *Rhus ovata,* and especially *Malosma laurina* occur at relatively low density and cover over a shorter, but higher cover layer of drought-deciduous shrubs such as *Artemisia californica, Encelia californica, Salvia mellifera, S. leucophylla, Eriogonum cinereum,* and *E. fasciculatum*. Thus, the initial classification developed for SAMO before extensive data analysis stressed the presence of such species as *Malosma laurina,* even if they occurred at much lower cover than the associated shorter drought-deciduous shrubs.

This structural relationship was not borne out in the first phase of data analysis. Instead, it became clear that the presence of shrubs such as *Malosma laurina* was often ubiquitous, occurring in many situations that were better defined in many cases by the associated shorter-stature drought-deciduous shrubs. The concept of the *Malosma laurina* Alliance was thus refined to include only those stands where *Malosma* was dominant or codominant with other shrubs (regardless of their stature) in the stand. This is one of many cautionary tales revolving around vegetation classification assumptions based on extrapolating data from seemingly similar situations in different geographies and environments.

Description Writing

Following the analysis of field data and development of the classification and key, association-level descriptions were written and based on field data and available literature. Scientific names of plants follow Hickman (1993) and UCB (2004). Common names follow these sources and USDA (2004). The primary compilers and developers of the data queries were Julie Evens and Anne Klein (California Native Plant Society) and Julie Christian (Santa Monica Mountains NRA). CNPS and TNC staff wrote local descriptions. Todd Keeler-Wolf (California Department of Fish and Game) wrote the keys, introductory material, and edited the description text. Todd Keeler-Wolf and Julie Evens wrote the descriptive sections on range and local and regional comments for descriptions. SAMO staff and Julie Evens edited the introduction, key, and final descriptions.

The following definitions and conventions were used in developing the descriptions and the keys.

1. **Cover:** The primary metric used to quantify the importance/abundance of a particular species or a particular vegetation layer within a stand. It is measured by estimating the aerial extent of the living plants, or the bird's-eye view looking from above, for each category. Cover in this and other California National Park Service vegetation classification and mapping projects uses the concept of "porosity" or foliar cover rather than "opacity" or crown cover. Thus, field crews are trained to estimate the amount of shade produced by the canopy of a plant or a stratum by taking into account the amount of shade it casts excluding the openings it may have in the interstitial spaces (e.g., between leaves or branches). This is assumed to provide a more realistic estimate of the actual amount of shade cast by the individual or stratum which, in turn, relates to the actual amount of light available to individual species or strata beneath it.

2. **Relative cover:** Refers to the amount of the surface of the plot or stand sampled that is covered by one species (or physiognomic group) as compared to (relative to) the amount of surface of the plot or stand covered by all species (in that group). Thus, 50 percent relative cover means that half of the total cover of all species or physiognomic groups is composed of the single species or group in question. Relative cover values are proportional numbers and, if added, total 100 percent for each stand (sample).

3. **Absolute cover:** Refers to the actual percentage of the ground (surface of the plot or stand) that is covered by a species or group of species. For example, *Pinus sabiniana* covers between 5 percent and 10 percent of the

stand. Absolute cover of all species or groups if added in a stand or plot may total greater or less than 100 percent because it is not a proportional number.

4. **Dominant:** Must be in at least 75 percent of the samples, with at least 50 percent relative cover in all samples.

5. **Codominant:** Must be in at least 75 percent of the samples, with at least 30 percent relative cover in all samples.

6. **Consistent/Characteristic/Diagnostic species:** Must be present in at least 75 percent of the samples, with no restriction on cover.

7. **Abundant species:** Must be present in at least 50 percent of the samples, with an average of at least 30 percent relative cover in all samples.

8. **Frequently/Often/Usually occurring species:** Must be present in at least 50 percent of the samples, with no restriction on cover.

9. **Infrequently occurring:** Present in less than 25 percent of the samples.

10. **Sparse:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is less than 8 percent absolute cover.

11. **Open:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is generally less than 33 percent absolute cover.

12. **Intermittent:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where there is 33–66 percent absolute cover.

13. **Continuous:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where there is greater than 66 percent absolute cover.

14. **Emergent:** A plant (or vegetation layer) is considered emergent if it includes a sparse cover of the plant, which rises above a predominant vegetation layer, and is considered a member of the next tallest layer but has an absolute cover < 10%. For example, individual *Quercus agrifolia* trees may comprise an emergent tree layer of 5 percent over a more

dense layer of *Artemisia californica* shrubs; the stand would be considered within the *Artemisia californica* Shrubland Alliance because the total tree cover is < 10% and the shrub cover is > 10%. Further, medium to tall shrubs are not considered emergent over shorter shrubs, but short trees are considered emergent over tall shrubs.

15. **Stand:** Is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small such as wetland seeps, and some may be several square kilometers in size such as desert or forest types. A stand is defined by two main unifying characteristics:

    a. It has *compositional* integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or gradual.

    b. It has *structural* integrity. It has a similar history or environmental setting, affording relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest formerly dominated by the same species but has burned on the upper part of the slope and not the lower is divided into two stands. Likewise, a sparse woodland occupying a slope with shallow rocky soils is considered a different stand from an adjacent slope of a denser woodland/forest with deep, more moist soil and the same species.

16. **Woody plant:** Is any species of plant that has noticeably woody stems. It does not include herbaceous species with woody underground portions such as tubers, roots, or rhizomes.

17. **Tree:** Is a one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases, trees may be multiple stemmed following ramifying after fire or other disturbance, but the size of mature plants is typically greater than 5 meters. Undisturbed individuals of these species are usually single stemmed.

18. **Shrub:** Is normally a multistemmed woody plant that is usually between 0.2 meters and 5 meters tall. Definitions are blurred at the low and high ends of the height scales. At the tall end, shrubs may approach trees based on disturbance frequencies (e.g., old-growth resprouting chaparral species such as *Cercocarpus betuloides, Fraxinus dipetala, Heteromeles arbutifolia, Prunus ilicifolia,* and so forth, may frequently attain "tree size"). At the short end, woody perennial herbs or subshrubs of various species are often difficult to categorize into a consistent life-form.

19. **Herbaceous plant:** Is any species of plant that has no main woody stem development and includes grasses, forbs, and dieback perennial species.

20. **Forest:** In the National Vegetation Classification, a forest is defined as a tree-dominated stand of vegetation with 60 percent or greater cover of trees. Most forest alliances tend to have average cover of trees > 60%, but individual stands under certain conditions may drop lower than 60 percent. This is reflective of the "modal" concept of the characteristics of a particular alliance.

21. **Woodland:** In the National Vegetation Classification, woodland is defined as a tree-dominated stand of vegetation with between 25 percent and 60 percent cover of trees. The same notion of "modality" that applies to forest types (#20) also applies here and to the sparsely wooded category (#22).

22. **Sparsely wooded:** These are stands with conspicuous trees (generally at least 10% absolute cover), but less than 25 percent cover may occur over shrubs as the dominant canopy (sparsely wooded shrubland) or herbaceous cover (sparsely wooded herbaceous).

23. **Other Noteworthy Species:** These are listed in the CNPS (2005) Online Inventory of Rare and Endangered Plants and per SAMO (2004). Species were listed in descending order of occurrence within the vegetation type.

24. **Distribution and Nonnative Species:** Local ecological regions and nonnative species were listed in descending order of occurrence within the sample dataset for each vegetation type.

25. **Conservation rank:** Listed by the state NatureServe Heritage Programs. All communities were ranked, though ones without much information were ranked with a "?" after the rank to denote that this rank may change with more information but that the best knowledge to date (sometimes personal observation) was used. Otherwise, hard references were used to place rank. These ranks are the "Global" and "State" ranks as seen below.

    a. **G1** and **S1:** Fewer than six viable occurrences worldwide and/or less than 2000 acres

    b. **G2** and **S2:** 6–20 viable occurrences worldwide and/or 2,000–10,000 acres

c. **G3** and **S3:** 21–100 viable occurrences worldwide and/or 10,000–50,000 acres

d. **G4** and **S4:** Greater than 100 viable occurrences worldwide and/or greater than 50,000 acres

26. **Minimum sample size for classification and description:** n = 3. Descriptions of associations with fewer than three samples were attempted if (a) the association was sampled and described by previous authors or (b) the vegetation was confirmed as distinctive and repeatable based on field reconnaissance or by photointerpretation signature.

27. **Sample(s):** Listed by their survey numbers from the vegetation databases and indicated using the following: rapid assessments begin with the alpha code "rap," and accuracy assessments begin with the alpha code AA (an abbreviation for accuracy assessment). Releve samples begin with the code "rap" followed by a numeric code and terminated with the alpha code "rlv." Successive numeric codes follow each of the alpha prefixes.

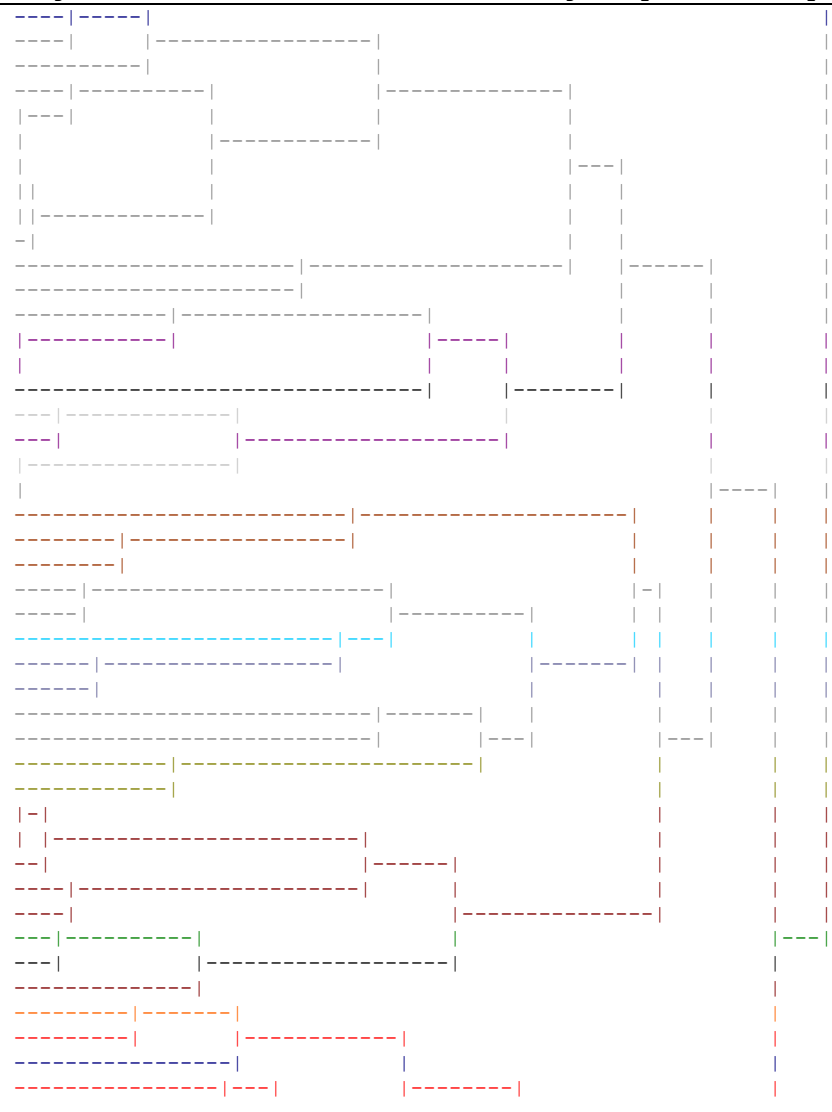
28. **Con, Avg, Min, Max:** A species table is provided at the end of each alliance or association description. The Con column provides the overall constancy value for each species within all rapid assessments and relevés classified as that vegetation type. The constancy values are between 0 and 100. Species that occurred with at least 20 percent constancy are listed in the table. The Avg column provides the average cover value for each species, as calculated across all samples in that vegetation type. The Min and Max values denote the minimum and maximum cover values of species listed in the table.

RESULTS

The final agglomerative cluster analyses for the classification used data from 3,912 of 4,014 surveys sampled, and it included the 254 most abundant of 544 species sampled in the rapid and accuracy assessments. An example of the cluster analysis with the final sample assignments to association and phase is shown in figure 3, and the final classification is shown in table 1.

In summary, 84 vegetation alliances or unique stands and 204 associations or phases were defined for the project. Of these, 177 types are fully described in this document as natural or seminatural vegetation units. These include associations, alliance-level units where insufficient sample size precluded further

analysis to the association level, and known or presumed rare stands that were not assigned to either associations or alliances (unique stands). Many association descriptions also contain brief descriptions of phases, which indicate further subassociation-level variation.

Survey #	Alliance	Diagram (clusters closest to left are ecologically more closely related)
rap2456rlv	Platanus racemosa	
rap2524rlv	California Annual	
rap2525rlv	California Annual	
rap2521rlv	California Annual	
rap2522rlv	California Annual	
rap2523rlv	California Annual	
rap2892rlv	California Annual	
rap2891rlv	California Annual	
rap2893rlv	California Annual	
rap2917rlv	California Annual	
rap2790rlv	California Annual	
rap2903rlv	California Annual	
rap2520rlv	California Annual	
rap2529rlv	Lolium multiflorum	
rap2849rlv	Lolium multiflorum	
rap2895rlv	Phalaris aquatica	
rap2527rlv	Avena spp.	
rap2530rlv	Lolium multiflorum	
rap2528rlv	Avena spp.	
rap2641rlv	California Annual	
rap2469rlv	Eriogonum fasciculatum	
rap2642rlv	Eriogonum fasciculatum	
rap2864rlv	Eriogonum fasciculatum	
rap2526rlv	California Annual	
rap2915rlv	California Annual	
rap2563rlv	Leymus triticoides	
rap2872rlv	Hazardia squarrosa	
rap2874rlv	Hazardia squarrosa	
rap2535rlv	Euphorbia terracina	
rap2916rlv	California Annual	
rap2536rlv	Baccharis pilularis	
rap2862rlv	Baccharis pilularis	
rap2532rlv	Nassella pulchra	
rap2533rlv	Nassella pulchra	
rap2534rlv	Nassella pulchra	
rap2873rlv	Nassella pulchra	
rap2913rlv	Nassella pulchra	
rap2863rlv	Opuntia spp.	
rap2897rlv	Pennisetum setaceum	
rap2914rlv	Nassella pulchra	
rap2457rlv	Alnus rhombifolia	
rap2464rlv	Quercus agrifolia	
rap2458rlv	Platanus racemosa	
rap2460rlv	Quercus agrifolia	

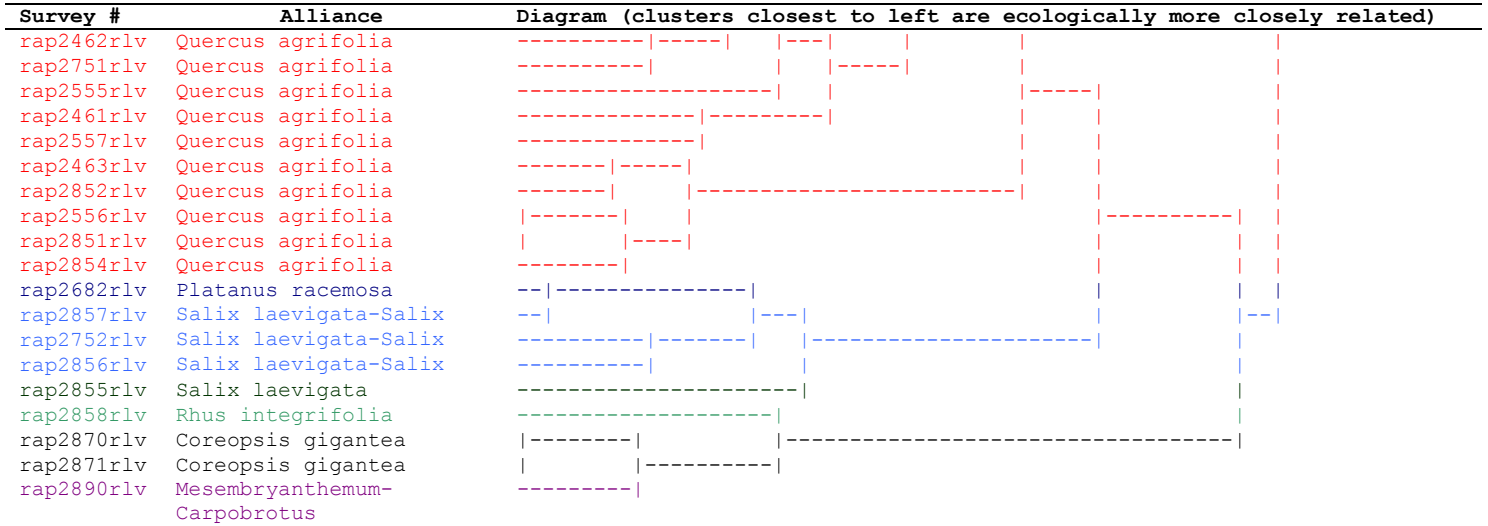


Figure 3. This is an example of the cluster analysis dendrogram using Sorensen's distance measure and flexible beta linkage method, showing the relationship of individual samples and their final alliance names to the cluster breaks.

Table 1. National Vegetation Classification standard list of types identified in this study. Hierarchy levels increase in resolution from left to right with the finest level, the phase, on the right. Corresponding mapping code numbers are provided on the far right. Darkest color denotes class difference, slightly lighter shading denotes formation difference, and lightest shading denotes alliance differences. The information within the Class, Hierarchy code, and Alliance Code field columns is derived from NatureServe (2005).

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
I. Forest							
	I.A.6.N.b	Lowland or submontane winter-rain evergreen sclerophyllous forest					
			A.84	*Eucalyptus*	*Eucalyptus* Alliance		9510
			A.87	*Umbellularia californica*	*Umbellularia californica* Alliance		1010
					Umbellularia californica/Ceanothus oliganthus		1012
					Umbellularia californica-Alnus rhombifolia		1013
					Umbellularia californica-Juglans californica/Ceanothus spinosus		1011
					Umbellularia californica-Platanus racemosa		1014
	I.B.2.N.d	Temporarily flooded cold-deciduous forest					
			A.306	*Alnus rhombifolia*	*Alnus rhombifolia* Alliance		1440
					Alnus rhombifolia-Platanus racemosa		1441
II. Woodland							
	II.A.5.N.a	Sclerophyllous extremely xeromorphic evergreen woodland					
			A.589	*Quercus agrifolia*	*Quercus agrifolia* Alliance		1110
					Quercus agrifolia		6122
					Quercus agrifolia/Adenostoma fasciculatum		6115
					Quercus agrifolia/Annual Grass-Herb		1111
					Quercus agrifolia/Ceanothus spinosus		1118

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Quercus agrifolia/Quercus berberidifolia		6112
					Quercus agrifolia/Salvia leucophylla-Artemisia californica		1116
					Quercus agrifolia/Toxicodendron diversilobum		1117
						Quercus agrifolia/Toxicodendron diversilobum	1117
						Quercus agrifolia/Mimulus aurantiacus	6113
					Quercus agrifolia/Heteromeles arbutifolia		6117
						Quercus agrifolia/Heteromeles arbutifolia	6117
						Quercus agrifolia/Malosma laurina	6116
					Quercus agrifolia-Juglans californica		1115
						Juglans californica-Quercus agrifolia/Toxicodendron diversilobum	6311
					Quercus agrifolia-Salix lasiolepis		6114
					Quercus agrifolia-Umbellularia californica		1114
						Quercus agrifolia-Umbellularia californica	1114
						Quercus agrifolia-Umbellularia californica/Toxicodendron diversilobum	6119
					Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus		1119
	II.B.2.N.a	Cold-deciduous woodland					
			A.607	*Juglans californica*	*Juglans californica* Alliance		1310
					Juglans californica/Annual Grass-Herb		1312
					Juglans californica/Artemisia californica/Leymus condensatus		1317

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Juglans californica/Ceanothus spinosus		1315
					Juglans californica/Heteromeles arbutifolia		6312
					Juglans californica/Malosma laurina		1314
			A.618	*Quercus lobata*	*Quercus lobata* Alliance		1320
					Quercus lobata/Annual Grass-Herb		1321
					Quercus lobata-Quercus agrifolia/Annual Grass-Herb		1323
					Quercus lobata-Salix lasiolepis		1324
	II.B.2.N.b	Temporarily flooded cold-deciduous woodland					
			A.634	*Platanus racemosa*	*Platanus racemosa* Alliance		1450
					Platanus racemosa		6451
					Platanus racemosa/Annual Grass-Herb		1456
					Platanus racemosa-Quercus agrifolia		1452
					Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana		1458
					Platanus racemosa-Quercus agrifolia-Salix lasiolepis		6452
			A.639	*Salix exigua*	*Salix exigua* Alliance		3110
			A.646	*Salix laevigata*	*Salix laevigata* Alliance		1420
			none	*Salix laevigata-Salix lasiolepis*	*Salix laevigata-Salix lasiolepis* Alliance		1410
					Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus/Annual Grass-Herb		1413
					Salix laevigata-Salix lasiolepis/Baccharis salicifolia		1412
			A.977	*Salix lasiolepis*	*Salix lasiolepis* Alliance		1430
					Salix lasiolepis/Baccharis salicifolia		1432

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association *Salix lasiolepis/Malosma laurina*	Phase	Map Code 1433
III. Shrubland							
	III.A.1.N.a.	Tropical or subtropical broad-leaved evergreen shrubland					
			none	*Schinus molle*	*Schinus molle* Alliance		9550
	III.A.2.N.a	Temperate broad-leaved evergreen shrubland					
			none	*Venegasia carpesioides*	*Venegasia carpesioides* Alliance		4750
	III.A.2.N.c	Sclerophyllous temperate broad-leaved evergreen shrubland					
			A.755	*Adenostoma fasciculatum*	*Adenostoma fasciculatum* Alliance		2010
					Adenostoma fasciculatum		2011
					Adenostoma fasciculatum-Ceanothus megacarpus		2019
					Adenostoma fasciculatum-Eriogonum fasciculatum		2017
						*Adenostoma fasciculatum-Eriogonum fasciculatum/*Annual Grass-Herb	
						Adenostoma fasciculatum-Lotus scoparius-Dendromecon rigida	7012
					Adenostoma fasciculatum-Malosma laurina		2013
					*Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium/*Annual Grass-Herb		7018
					Adenostoma fasciculatum-Mimulus aurantiacus		7013
					Adenostoma fasciculatum-Salvia leucophylla		2018

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			none	*Adenostoma fasciculatum-Quercus berberidifolia*	*Adenostoma fasciculatum-Quercus berberidifolia* Association		2581
			none	*Adenostoma fasciculatum-Adenostoma sparsifolium*	*Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius* Association		2042
			none	*Adenostoma fasciculatum-Arctostaphylos glandulosa*	*Adenostoma fasciculatum-Arctostaphylos glandulosa* Association		2021
						Adenostoma fasciculatum-Ceanothus megacarpus-Arctostaphylos glandulosa	7017
			none	*Adenostoma fasciculatum-Arctostaphylos glauca*	*Adenostoma fasciculatum-Arctostaphylos glauca* Association		2531
			none	*Adenostoma fasciculatum-Ceanothus crassifolius*	*Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Association		2572
			none	*Adenostoma fasciculatum-Ceanothus cuneatus*	*Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Association		2511
			none	*Adenostoma fasciculatum-Salvia mellifera*	*Adenostoma fasciculatum-Salvia mellifera*/Grass-Herb Association		2036
					Adenostoma fasciculatum-Salvia mellifera-Malosma laurina		2035
					Adenostoma fasciculatum-Salvia mellifera-Rhus ovata		2038
			A.756	*Adenostoma sparsifolium*	*Adenostoma sparsifolium* Alliance		2050
			A.757	*Arctostaphylos glandulosa*	*Arctostaphylos glandulosa* Alliance		2550
			A.759	*Arctostaphylos glauca*	*Arctostaphylos glauca* Alliance		2540
			A.764	*Ceanothus crassifolius*	*Ceanothus crassifolius* Alliance		2060
				Ceanothus crassifolius	*Ceanothus crassifolius*		2063
					Ceanothus crassifolius-Malosma laurina		2065

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.765	*Ceanothus cuneatus*	*Ceanothus cuneatus* Alliance		2520
					Ceanothus cuneatus-Quercus berberidifolia		2521
			A.770	*Ceanothus megacarpus*	*Ceanothus megacarpus* Alliance		2080
					Ceanothus megacarpus		2081
					Ceanothus megacarpus-Adenostoma fasciculatum		2083
						Ceanothus megacarpus-Adenostoma fasciculatum-Salvia mellifera	7083
					Ceanothus megacarpus-Adenostoma sparsifolium		2082
					Ceanothus megacarpus-Cercocarpus betuloides		2084
						Ceanothus megacarpus-Quercus berberidifolia	2089
					Ceanothus megacarpus-Malosma laurina		2087
						Ceanothus megacarpus-Malosma laurina-Adenostoma fasciculatum Mixed Chaparral	7081
						Ceanothus megacarpus-Malosma laurina-Salvia mellifera-Mixed Coastal Sage	2085
					Ceanothus megacarpus-Salvia mellifera		7085
			A.771	*Ceanothus oliganthus*	*Ceanothus oliganthus* Alliance		2070
					Ceanothus oliganthus		2072
					Ceanothus oliganthus-Adenostoma sparsifolium		2078
					Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata		2076
					Ceanothus oliganthus-Quercus berberidifolia		2077
			none	*Ceanothus spinosus*	*Ceanothus spinosus* Alliance		2090

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Ceanothus spinosus		2092
						Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia	2094
						Ceanothus spinosus-Malosma laurina	2097
					Ceanothus spinosus-Ceanothus megacarpus		2091
			A.896	*Cercocarpus betuloides*	*Cercocarpus betuloides* Association		2114
					Cercocarpus betuloides-Adenostoma fasciculatum		2115
					Cercocarpus betuloides-Malosma laurina-Artemisia californica		2117
						Cercocarpus betuloides-Artemisia californica/Melica imperfecta	2111
						Cercocarpus betuloides-Malosma laurina-Artemisia californica	2117
					Cercocarpus betuloides-Ceanothus spinosus		2113
			none	*Dendromecon rigida*	*Dendromecon rigida* Alliance		3350
			none	*Heteromeles arbutifolia*	*Heteromeles arbutifolia* Alliance		2130
					Heteromeles arbutifolia-Malosma laurina		2138
						Heteromeles arbutifolia-Artemisia californica-Mimulus aurantiacus	2135
						Heteromeles arbutifolia-Malosma laurina	2138
						Heteromeles arbutifolia-Cercocarpus betuloides	2136
						Heteromeles arbutifolia	2137
						Heteromeles arbutifolia-Salvia mellifera-Rhus spp.	2133
			none	*Malosma laurina*	*Malosma laurina* Alliance		2140
					Malosma laurina		7142

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
						Malosma laurina/Annual Grass-Herb	2145
					Malosma laurina-Artemisia californica		7148
						Malosma laurina-Artemisia californica	7148
						Malosma laurina-Artemisia californica-Salvia leucophylla	2142
					Malosma laurina-Eriogonum cinereum		2141
						Malosma laurina-Eriogonum cinereum	2141
						Malosma laurina-Eriogonum cinereum-Lotus scoparius	7144
						Malosma laurina-Eriogonum cinereum-Salvia mellifera	7141
						Malosma laurina-Malacothamnus fasciculatus-Eriogonum cinereum-Salvia mellifera	7146
						Malosma laurina-Rhus integrifolia-Eriogonum cinereum-Artemisia californica	21413
					Malosma laurina-Rhus ovata-Ceanothus megacarpus		21415
					Malosma laurina-Salvia mellifera		2148
					Malosma laurina-Eriogonum fasciculatum		21423
						Malosma laurina-Eriogonum fasciculatum	21423
						Malosma laurina-Eriogonum fasciculatum-Artemisia californica/Annual Grass-Herb	3382

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
						Malosma laurina-Eriogonum fasciculatum-Heteromeles arbutifolia-Ceanothus megacarpus	3383
			A.2608	*Prunus ilicifolia*	*Prunus ilicifolia-Heteromeles arbutifolia* Association		2121
			A.777	*Quercus berberidifolia*	*Quercus berberidifolia* Alliance		2160
					Quercus berberidifolia		2161
						Quercus berberidifolia	2161
						Quercus berberidifolia-Heteromeles arbutifolia	2164
						Quercus berberidifolia-Adenostoma fasciculatum	2163
					Quercus berberidifolia-Ceanothus spinosus		2167
			none	*Quercus berberidifolia-Cercocarpus betuloides*	*Quercus berberidifolia-Cercocarpus betuloides* Association		2591
			A.786	*Quercus wislizeni* var. *frutescens*	*Quercus wislizeni var. frutescens* Alliance		2560
			none	*Rhus integrifolia*	*Rhus integrifolia* Alliance		2150
					Rhus integrifolia		2153
						Rhus integrifolia	2153
						Rhus integrifolia-Heteromeles arbutifolia	2158
						Rhus integrifolia-Malacothamnus fasciculatus	7153
					Rhus integrifolia-Artemisia californica-Eriogonum cinereum		7157
						Rhus integrifolia-Artemisia californica-Salvia leucophylla	2155
						Rhus integrifolia-Eriogonum cinereum-Yucca whipplei-Coreopsis gigantea	7155
					Rhus integrifolia-Opuntia spp.*-Eriogonum cinereum*		2151

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			none	*Rhus ovata*	*Rhus ovata* Association		2193
					Rhus ovata-Salvia leucophylla-Artemisia californica		2192
	III.A.4.N.a	Lowland microphyllous evergreen shrubland					
			A.836	*Baccharis pilularis*	*Baccharis pilularis* Alliance		2310
					Baccharis pilularis/Annual Grass-Herb		2311
			none	*Baccharis pilularis-Artemisia californica*	*Baccharis pilularis-Artemisia californica* Alliance		2310
					Baccharis pilularis-Artemisia californica		2313
						Baccharis pilularis-Artemisia californica-Salvia leucophylla	2315
						Baccharis pilularis-Malosma laurina-Artemisia californica	2314
			none	*Hazardia squarrosa*	*Hazardia squarrosa* Alliance		3260
					Hazardia squarrosa-Artemisia californica		3262
						Hazardia squarrosa/Annual Grass-Herb	3261
						Hazardia squarrosa-Artemisia californica/Leymus condensatus	3262
					Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata		3263
						Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata	3263
			none	*Spartium junceum*	*Spartium junceum* Alliance		9542
	III.A.4.N.b	Intermittently flooded microphyllous shrubland					
			A.838	*Lepidospartum squamatum*	*Lepidospartum squamatum* Alliance		2220
	III.A.5.N.b	Facultatively deciduous extremely xeromorphic subdesert shrubland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.815	*Artemisia californica*	*Artemisia californica* Association		8213
						Artemisia californica/Annual Grass-Herb	8213
						Artemisia californica-Salvia leucophylla	3211
						Artemisia californica-Malosma laurina	3219
					Artemisia californica/Leymus condensatus		3216
					Artemisia californica-Eriogonum cinereum		3214
						Artemisia californica-Eriogonum cinereum-Mimulus aurantiacus/Melica imperfecta	3218
					Artemisia californica-Mimulus aurantiacus		8214
			none	*Artemisia californica-Eriogonum fasciculatum*	*Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Association		3371
					Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla		3372
					Artemisia californica-Eriogonum fasciculatum-Salvia mellifera		3373
			none	*Atriplex lentiformis*	*Atriplex lentiformis* Alliance		2330
			A.772	*Encelia californica*	*Encelia californica*		3222
						Encelia californica-Eriogonum fasciculatum	3224
					Encelia californica-Artemisia californica		3227
					Encelia californica-Eriogonum cinereum		3225
					Encelia californica-Malosma laurina-Salvia mellifera		3221
					Encelia californica-Rhus integrifolia		3226
			none	*Eriogonum cinereum*	*Eriogonum cinereum*		3257

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
						Eriogonum cinereum-Malacothamnus fasciculatus/Leymus condensatus	3259
			A.868	*Eriogonum fasciculatum*	*Eriogonum fasciculatum* Association		3241
						Eriogonum fasciculatum-Lotus scoparius	3249
						Eriogonum fasciculatum	3241
					Eriogonum fasciculatum-Salvia mellifera-Malosma laurina		3248
			A.773	*Eriogonum fasciculatum-Salvia apiana*	*Eriogonum fasciculatum-Salvia apiana* Alliance		3410
			none	*Mimulus aurantiacus*	*Mimulus aurantiacus-Malosma laurina* Association		2172
						Mimulus aurantiacus-Malosma laurina	2172
						Mimulus aurantiacus-Salvia leucophylla	2171
			A.748	*Salvia leucophylla*	*Salvia leucophylla* Alliance		3390
			none		*Salvia leucophylla* Association		3316
						Salvia leucophylla	3316
						Salvia leucophylla/Leymus condensatus	3319
						Salvia leucophylla/Nassella spp.	3311
						Salvia leucophylla-Artemisia californica-Malacothamnus fasciculatus	8311
			none		*Salvia leucophylla-Artemisia californica* Association	*Salvia leucophylla-Artemisia californica*	3391
						Salvia leucophylla-Artemisia californica/Leymus condensatus	3393

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella	*Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella*	3396
						Salvia leucophylla-Artemisia californica-Malosma laurina/Nassella	3395
						Salvia leucophylla-Artemisia californica-Mimulus aurantiacus	3392
					Salvia leucophylla-Eriogonum cinereum/Annual Grass-Herb		3312
			A.749	*Salvia mellifera*	*Salvia mellifera* Alliance		3320
						Salvia mellifera	3324
						Salvia mellifera-Adenostoma fasciculatum	3329
						Salvia mellifera-Eriogonum fasciculatum	3321
						Salvia mellifera-Malacothamnus fasciculatus	3322
				Salvia mellifera-Artemisia californica	*Salvia mellifera-Artemisia californica*		3421
						Salvia mellifera-Artemisia californica-Salvia leucophylla	8323
					Salvia mellifera-Eriogonum cinereum		3323
					Salvia mellifera-Malosma laurina		8324
						Salvia mellifera-Malosma laurina	8324
						Salvia mellifera-Artemisia californica-Rhus integrifolia	8322
					Salvia mellifera-Rhus ovata		8325
	III.A.5.N.c	Succulent extremely xeromorphic evergreen shrubland					
			none	*Opuntia* spp.	*Opuntia* spp.-Mixed Coastal Sage Scrub Association		2412

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
	III.B.1.N.a	Lowland drought-deciduous shrubland					
			none	*Coreopsis gigantea*	*Coreopsis gigantea-Artemisia californica-Eriogonum cinereum* Association		3345
					Coreopsis gigantea-Ericameria ericoides-Encelia californica		3342
			none	*Malacothamnus fasciculatus*	*Malacothamnus fasciculatus* Association		3287
					Malacothamnus fasciculatus-Ceanothus spinosus		3289
					Malacothamnus fasciculatus-Ceanothus megacarpus		3288
					Malacothamnus fasciculatus-Malosma laurina		3286
					Malacothamnus fasciculatus-Salvia leucophylla		3281
					Malacothamnus fasciculatus-Salvia mellifera		3282
	III.B.2.N.c	Intermittently flooded cold-deciduous shrubland					
			A.933	*Baccharis salicifolia*	*Baccharis salicifolia*-Riparian Association		2212
	III.B.2.N.c	Intermittently flooded cold-deciduous shrubland					
			none	*Rosa californica*	*Rosa californica* Alliance		3010
	III.B.2.N.c	Intermittently flooded cold-deciduous shrubland					
			A.935	*Sambucus mexicana*	*Sambucus mexicana/Leymus condensatus*-Annual Grass-Herb Association		3021
					*Sambucus mexicana-Heteromeles arbutifolia/*Annual Grass-Herb		3022
	III.C.2.N.a	Mixed evergreen cold-deciduous shrubland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.2610	*Toxicodendron diversilobum*	*Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Association		3331
					Toxicodendron diversilobum-Mimulus aurantiacus		3332
IV. Dwarf Shrubland							
	IV.A.2.N.b	Facultatively deciduous subdesert dwarf-shrubland					
			none	*Lotus scoparius*	*Lotus scoparius* Alliance		3270
						*Lotus scoparius-Artemisia californica/*Annual Grass-Herb	3273
						Lotus scoparius-Malacothamnus fasciculatus-Adenostoma fasciculatum-Salvia mellifera	3272
V. Herbaceous Vegetation							
	V.A.5.N.a	Tall sod temperate grassland					
			none	*Leymus condensatus*	*Leymus condensatus* Association		4041
	V.A.5.N.d	Medium-tall bunch temperate or subpolar grassland					
			A.1248	*Nassella lepida*	*Nassella lepida* Alliance		4090
			A.1289	*Nassella pulchra*	*Nassella* Alliance		4020
			A.1289	*Nassella pulchra*	*Nassella pulchra-Hazardia squarrosa*		4021
			none	*Pennisetum setaceum*	*Pennisetum setaceum* Alliance		4060
					Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina		4061
			none	*Phalaris aquatica*	*Phalaris aquatica* Alliance		4070
	V.A.5.N.i	Intermittently flooded temperate or subpolar grassland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.1332	*Distichlis spicata*	*Distichlis spicata-Ambrosia chamissonis* Association		4511
					Distichlis spicata-Salicornia virginica-Jaumea carnosa		4527
						Distichlis spicata-Salicornia virginica-Jaumea carnosa	4527
						Distichlis spicata-Jaumea carnosa	4514
	V.A.5.N.j	Temporarily flooded temperate or subpolar grassland					
			A.1339	*Arundo donax*	*Arundo donax* Alliance		4310
			A.1353	*Leymus triticoides*	*Leymus triticoides* Alliance		4030
	V.A.5.N.k	Seasonally flooded temperate or subpolar grassland					
			none	*Juncus effusus*	*Juncus effusus* Alliance		4330
	V.A.5.N.l	Semipermanently flooded temperate or subpolar grassland					
			A.1171	*Scirpus californicus*	*Scirpus californicus* Alliance		4410
			A.1394	*Typha* sp.	*Typha* sp. Alliance		4420
	V.B.2.N.a	Tall temperate or subpolar perennial forb vegetation					
			none	*Foeniculum vulgare*	*Foeniculum vulgare* Alliance		4760
			none	*Euphorbia terracina*	*Euphorbia terracina* Stands		4771
	V.B.2.N.	Intermittently flooded perennial herbaceous vegetation					
			none	*Lepidium latifolium*	*Lepidium latifolium* Alliance		4780
	V.B.2.N.b	Creeping or matted cold-deciduous dwarf-shrubland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.1620	*Mesembryanthemum* spp.-*Carpobrotus* spp. Seminatural Herbaceous Alliance	*Carpobrotus edulis* Association		4720
	V.B.2.N.b	Low temperate or subpolar perennial forb vegetation					
			none	*Selaginella bigelovii*	*Selaginella bigelovii/Eriogonum fasciculatum* Association		4811
	V.B.2.N.g.	Tidal temperate perennial forb vegetation					
			none	*Frankenia salina*	*Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Association		4551
			A.2618	*Salicornia virginica*	*Salicornia virginica/Algae* Association		4528
					Salicornia virginica-Brassica nigra		4529
					Salicornia virginica-Frankenia salina		4524
					Salicornia virginica-Frankenia salina-Batis maritima Dry		4526
					Salicornia virginica-Jaumea carnosa		4527
					Salicornia virginica-Salicornia subterminalis		4525
					Salicornia virginica-Suaeda taxifolia		45201
	V.D.2.N.	Medium-tall temperate annual grassland					
			none	California Annual Grassland/Herbaceous Alliance			5000
					Brassica nigra		5000
					Brassica nigra-Bromus diandrus		5000
					Brassica nigra-Centaurea melitensis		5000
					Bromus diandrus		5000
					Bromus diandrus-Avena spp.		5000

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Avena fatua Association (and *Avena* spp. Alliance)		5000 (4220)
					Lolium multiflorum Association and Alliance		5000 (4210)

KEY

The key for distinguishing vegetation types (table 2) is not strictly dichotomous. Because of the diversity of vegetation in the mapping area and to avoid an excessively long document, a series of paired statements (or couplets) was not developed for each option. Instead, sets of characteristics with choices beneath them are provided. The key will first lead the user to the general options, and the individual selections for the vegetation associations will be listed beneath these options. Simply work through the numbered list of types from the more general to the most specific options until the best fit is reached. The choices are identified by a combination of alphanumeric codes, using capital letters, numerals, upper- and lowercase letters, and decimal points to distinguish the different key levels. The most basic, general levels in the key are on the left side of the alphanumeric code, and the most specific are on the right side. This coding system in the key relates to a series of left indentations. Thus, down the left-hand side of the pages are the major groupings; nested within them are the subgroupings. Phases, if present, are listed directly below the association in the key with a brief description. Mapping units (defined as an informal, visually distinct structural assemblage of plants that does not correlate directly with a floristically defined alliance, association, or phase used by the photointerpreters), are also defined where appropriate herein.

The preliminary key will direct you to the major groups, such as forest/woodland, shrubland, and herbaceous, with the more specific choices beneath them. The more specific lists within these are generally based on presence/absence or dominance/subordinance of species until arriving at the optimum choice. *Please note: Since there may be more than two alternatives in a group, be sure to work through all of the options in a list before you decide what is the best choice.*

Table 2: Field key to the defined vegetation associations of the Santa Monica Mountains and Simi Hills area, Ventura and Los Angeles counties, California.

Class A. Vegetation with an overstory of trees (at least 5 m tall). Absolute tree canopy cover is generally >10% but occasionally may be < 10% over a denser understory of shrub and/or herbaceous species. If the latter, trees are evenly distributed across the stand and are ecologically significant members of the stand (stand is thus "characterized" by trees, even if not "dominated" by them). = **Tree-Overstory Vegetation**

Class B. Vegetation characterized by woody shrubs in the canopy. Tree species, if present, generally total < 10% absolute cover. Herbaceous species may total higher cover than shrubs. Shrubs are usually at least 10% cover. = **Shrub-Overstory Vegetation**

Class C. Vegetation characterized by nonwoody, herbaceous species in the canopy including grass, graminoid, and broad-leaved herbaceous species. Shrubs, if present, usually comprise < 10% absolute cover. Trees, if present, generally compose < 5% absolute cover. = **Herbaceous Vegetation**

Class A. Tree-Overstory Vegetation

Group I: Woodlands and forests characterized by needle or scale-leaved conifer trees including pine *(Pinus).* The conifers may only occur intermittently in the overstory and may be associated with tree oaks or shrubs.

I.A. The overstory is dominated by pine *(Pinus)* or other coniferous trees (none native to the mapping area) alone or in shared dominance with broadleaf evergreen trees or shrubs.

> **I.A.1.** Introduced pine (*Pinus* sp.) or other conifers occur as the dominant tree or co-occurs with other tree species in an open overstory, associated with roadsides and human habitation. (Note: This is not a vegetation type since all occurrences are plantations.)
>
> ***Pinus* mapping unit (9520)**

Group II. Woodlands and forests characterized mainly by broad-leaved evergreen and deciduous tree species such as oaks *(Quercus),* willows *(Salix),* bay *(Umbellularia californica),* California walnut *(Juglans californica),* and California sycamore *(Platanus racemosa).*

II.A. California sycamore is the sole dominant tree in the canopy or shares dominance with coast live oak or willows, which may be in the canopy or subcanopy.

***Platanus racemosa* Alliance (1450)**

II.A.1. California sycamore is the sole dominant tree over either a sparse understory of shrubs and herbs or dense annual grasses and herbs.

II.A.1.a. California sycamore is the sole dominant tree with no characteristic species in either the canopy or understory.

Platanus racemosa* South Coast Intermittent Stream Association *(*6451*)

II.A.1.b. California sycamore is the sole dominant tree in the overstory. The understory has a significant mixed cover of grasses, herbs, and shrubs.

***Platanus racemosa/*Annual Grass-Herb Association (1456)**

II.A.2. Coast live oak usually shares dominance with California sycamore in the overstory (they either may be codominant or dominant). Arroyo willow may be present.

II.A.2.a California sycamore and coast live oak occur in the canopy with no significant cover of any other large riparian trees or shrubs.

***Platanus racemosa-Quercus agrifolia* South Coast Association (1452)**

II.A.2.b. Coast live oak usually shares dominance with California sycamore in the overstory. In the understory, arroyo willow occurs with mule fat *(Baccharis salicifolia)* and other species.

***Platanus racemosa-Quercus agrifolia-Salix lasiolepis* Association (6452)**

II.A.2.c. Coast live oak usually shares dominance with California sycamore in the overstory. In the understory, mule fat *(Baccharis salicifolia*) dominates, and mugwort *(Artemisia douglasiana)* is usually present.

***Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/ Artemisia douglasiana* South Coast Association (1458)**

II.B. California walnut *(Juglans californica)* provides an open to intermittent tree overstory canopy (in some cases it may be a large shrub). It may co-occur and codominate with coast live oak. Shrubs of either chaparral *(Ceanothus* sp.,

Heteromeles arbutifolia, etc.) or coastal sage scrub *(Artemisia californica, Salvia leucophylla)* as well as annual or perennial grasses may occur in the understory.

***Juglans californica* Alliance (1310)**

II.B.1. California walnut is the sole dominant tree (or large shrub) in the overstory. Shrubs are sparse to open, while annual grasses and herbs are abundant in the understory.

***Juglans californica*/Annual Grass-Herb Association (1312)**

II.B.2. California walnut is dominant in the tree overstory, and stands contain significant and obvious shrubs of either chaparral or coastal scrub affinities *(Ceanothus spinosus, Malosma laurina, Heteromeles arbutifolia, Artemisia californica, Salvia leucophylla)* in the understory subcanopy.

II.B.2.a. California walnut is the sole dominant tree (or occasionally, large shrub) and greenbark ceanothus is strongly dominant in the shrub layer.

***Juglans californica/Ceanothus spinosus* Association (1315)**

II.B.2.b. Laurel sumac is dominant in the shrub understory, although a number of other shrubs (some often early seral such as *Malacothamnus fasciculatus*) may be present at low cover.

***Juglans californica/Malosma laurina* Association (1314)**

II.B.2.c. California sagebrush is codominant to dominant often with purple sage in the shrub understory. Giant wild rye is usually present in significant cover in the herb layer. California walnut is dominant in the overstory.

***Juglans californica/Artemisia californica/Leymus condensatus* Association (1317)**

II.B.2.d. Toyon is the dominant shrub in the understory with coast live oak present but always subdominant to California walnut in the tree layer. Sugar bush and several other typically chaparral shrubs are usually present along with toyon in the shrub layer.

***Juglans californica/Heteromeles arbutifolia* Association (6312)**

II.B.3. California walnut is subdominant to codominant with coast live oak in the overstory, and the understory may be open and grassy or may have shrub layer with poison oak.

***Quercus agrifolia-Juglans californica* Association (1115)**

Note: Two phases of this association occur: One in which the shrub layer is low in cover (trace cover of poison oak) while the herbaceous layer is usually moderately to highly developed, and another in which the shrub layer has moderate to high cover of poison oak and other shrub species such as toyon and elderberry.

***Quercus agrifolia-Juglans californica* Phase (1115)**

***Juglans californica-Quercus agrifolia/Toxicodendron diversilobum* Phase (6311)**

II.C. Oaks (either valley oak or coast live oak) are the dominant trees in the overstory.

II.C.1. Valley oak is the dominant or conspicuous tree occurring as a sole dominant or as codominant with coast live oak and/or arroyo willow.

***Quercus lobata* Alliance (1320)**

II.C.1.a. Valley oak occurs in nonriparian settings over an understory with sparse shrubs and characterized by annual grasses and herbs, with or without coast live oak.

II.C.1.a.i. Valley oak is the sole dominant tree over annual grasses and herbs. Coast live oak and/or walnut may be present but in total never more than half the cover of valley oak.

***Quercus lobata*/Annual Grass-Herb Association (1321)**

II.C.1.a.ii. Valley oak occurs with coast live oak as a codominant or subdominant in the tree layer over annual grasses and herbs.

***Quercus lobata-Quercus agrifolia*/Annual Grass-Herb Association (1323)**

II.C.1.b. Valley oak occurs with shrubby or tree-sized arroyo willow in riparian settings.

***Quercus lobata-Salix lasiolepis* Association (1324)**

II.C.2. Coast live oak occurs as the dominant tree in the canopy, while California sycamore and/or California bay may be subdominant to codominant.

***Quercus agrifolia* Alliance (1110)**

II.C.2.a. Willows (*Salix lasiolepis* primarily) are subdominant trees with coast live oak in riparian or ravine settings.

III.C.2.a.i. Arroyo willow and/or red willow are subdominant overstory or understory trees with coast live oak. Riparian shrubs and herbs may also be present, including mule fat, mugwort, and rorippa.

***Quercus agrifolia-Salix lasiolepis* Association (6114)**

II.C.2.b. Coast live oak is usually the sole dominant tree species in the overstory in upland (usually nonriparian) settings over a variety of understory layers from grassy to scrubby.

II.C.2.b.i. While the overstory is dominated solely by coast live oak, the understory is sparse to low in cover and may have occasional shrubs or herbs.

***Quercus agrifolia* South Coastal Association (6122)**

II.C.2.b.ii. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by annual grasses and herbs.

***Quercus agrifolia*/Annual Grass-Herb Association (1111)**

II.C.2.b.iii. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by poison oak and/or bush monkey flower in one layer and annual grasses and herbs in another layer, though the shrub layer usually has higher understory cover.

***Quercus agrifolia/Toxicodendron diversilobum* Association (1117)**

Note: This association includes the following phase, which may contain poison oak at sparse to moderate cover but also has bush monkey flower at moderate to high cover.

***Quercus agrifolia/Mimulus aurantiacus* Phase (6113)**

II.C.2.b.iv. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by toyon. Laurel sumac may be present. If poison oak is present, cover is less than toyon.

***Quercus agrifolia/Heteromeles arbutifolia* Association (6117)**

Note: This association includes the following phase, which contains toyon and laurel sumac at moderate cover.

***Quercus agrifolia/Malosma laurina* Phase (6116)**

II.C.2.b.v. Chamise occurs as an open to dense understory under an open canopy of coast live oak.

***Quercus agrifolia/Adenostoma fasciculatum* Association (6115)**

II.C.2.b.vi. Greenbark ceanothus occurs as a tall understory shrub associated with an open to intermittent canopy of coast live oak.

***Quercus agrifolia/Ceanothus spinosus* Association (1118)**

II.C.2.b.vii. Scrub oak occurs as the principal understory shrub in an open to intermittent overstory of coast live oak.

***Quercus agrifolia/Quercus berberidifolia* Association (6112)**

II.C.2.b.viii. Both purple sage and California sagebrush occur as understory shrubs to an open to intermittent canopy of coast live oak.

***Quercus agrifolia/Salvia leucophylla-Artemisia californica* Association (1116)**

II.C.2.c. California bay is subdominant to codominant with coast live oak in the overstory. The understory may be open and grassy or may include a moderate to high cover of shrub cover.

II.C.2.c.i. Hairy leaf ceanothus occurs as a tall understory shrub associated with an open to intermittent canopy of coast live oak and frequently California bay. If poison oak is present, it is trace in cover.

***Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus* Association (1119)**

II.C.2.c.ii. The understory is usually open, though shrubs such as poison oak, toyon, and greenbark ceanothus may also be present at low to moderate cover.

***Quercus agrifolia-Umbellularia californica* Association (1114)**

Note: This association includes the following two phases: One contains poison oak at moderate cover but may also have other shrub species at low to moderate cover, and the other contains no poison oak.

***Quercus agrifolia-Umbellularia californica/Toxicodendron diversilobum* Phase (6119)**
***Quercus agrifolia-Umbellularia californica* Phase (1114)**

II.D. One or more willow species are the primary tree(s) in the riparian overstory. (Note: Although some willows may be considered shrubs in this area, most are tall enough to be identified as tree willows, and there is no separation of tree and shrub willow categories in this key.)

II.D.1. Arroyo willow *(S. lasiolepis)* is the dominant tree in the canopy or is codominant with red willow *(Salix laevigata)* in the canopy.

II.D.1.a. Red willow occurs with arroyo willow as a sub- or codominant in the overstory.

II.D.1.a.i. California blackberry and mugwort *(Artemisia douglasiana)* are usually present in the understory with a variety of other herbs and shrubs.

***Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus*/Annual Grass-Herb Association (1413)**

II.D.1.a.ii. Red willow and arroyo willow are co- or subdominant, but stands lack California blackberry and/or mugwort.

***Salix laevigata-Salix lasiolepis* Association (1410)**

II.D.1.a.iii. Red willow and arroyo willow both occur in the tree or tall shrub layer with mule fat as the characteristic shorter shrub.

***Salix laevigata-Salix lasiolepis/Baccharis salicifolia* Association (1412/1432)**

II.D.2. Riparian shrublands or woodlands in which arroyo willow *(Salix lasiolepis)* is dominant. An emergent and sparse tree layer may also be present.

***Salix lasiolepis* Alliance (1430)**

II.D.2.a. Laurel sumac is a common and characteristic shrub associating with the overstory-dominant arroyo willow, occasionally seen on seeps and bluffs along the immediate coast.

***Salix lasiolepis/Malosma laurina* Association (1433)**

II.D.2.b. Mule fat is a characteristic subdominant or codominant with arroyo willow.

***Salix lasiolepis/Baccharis salicifolia* Association (1414)**

II.D.3. The overstory is dominated by the clonal shrubby to short tree-sized narrow-leaved willow. Stands are uncommon and usually small in the study area.

***Salix exigua* Alliance (3110)**

II.D.4. Red willow is the sole dominant.

***Salix laevigata* Alliance (1420)**

II.E. White alder *(Alnus rhombifolia*) is the dominant or, most commonly, it shares dominance with other trees. It is usually restricted to permanently flowing streams close to the coast.

***Alnus rhombifolia* Alliance (1440)**

II.E.1. White alder is codominant to subdominant with California sycamore.

***Alnus rhombifolia-Platanus racemosa* Association (1441)**

II.F. A species of *Eucalyptus* dominates in the tree/shrub canopy, though there may be a minor presence of native trees/shrubs. Most stands are planted and noninvasive in this study area.

***Eucalyptus* Alliance (9510)**

II.G. California bay occurs as a tree or tall shrub usually dominant or codominant with coast live oak, California walnut, California sycamore, white alder, or taller mesic chaparral shrubs such as greenbark or hairy leaf ceanothus *(Ceanothus spinosus* or *C. oliganthus).*

***Umbellularia californica* Alliance (1010)**

II.G.1. California bay dominates or codominates in upland settings and not usually adjacent to streams or bottomlands.

II.G.1.a. California bay is either a shrub or a tree of rocky upland settings associated with hairy leaf ceanothus and usually associated with coast live oak in lower cover.

***Umbellularia californica/Ceanothus oliganthus* Association (1012)**

II.G.2. California bay occurs in stands in convex upper slopes and ravines or in true riparian settings adjacent to streams and associated with California walnut, California sycamore, or white alder.

II.G.2.a. California bay occurs along perennial streams with white alder, rare and local in the Santa Monica Mountains.
***Umbellularia californica-Alnus rhombifolia* Association (1013)**

II.G.2.b. California bay occurs along streams or in ravines with codominance to a low cover presence of California sycamore.
***Umbellularia californica-Platanus racemosa* Association (1014)**

II.G.2.c. California bay occurs with California walnut as a frequent subdominant and greenbark ceanothus as the principal understory shrub, usually in ravines and concavities on slopes.
***Umbellularia californica-Juglans californica/Ceanothus spinosus* Association (1011)**

II.H. Interior live oak occurs as a dominant or codominant in the tree/shrub overstory.

***Quercus wislizeni* Alliance (2560)**

Note: In this study the few known stands of *Quercus wislizeni* Alliance appear to be dominated by shrubby individuals and have been placed in the Shrub-Overstory Vegetation section of this classification. For thoroughness and assuming that there may be some stands that reach near tree-size, they may be keyed here or in the shrub key that follows.

Class B. Shrub-Overstory Vegetation

Group I: Shrublands are dominated by sclerophyllous temperate broad-leaved shrubs (with leaves hardened by a waxy cuticle). They are dominated by typical chaparral shrub genera including chamise *(Adenostoma fasciculatum*), manzanita *(Arctostaphylos*), *Ceanothus,* mountain mahogany *(Cercocarpus),* scrub oaks *(Quercus),* coffeeberry *(Rhamnus),* and so forth. This group also includes vegetation dominated or codominated by large broad-leaved evergreen species such as *Malosma laurina* and *Rhus* spp., which may be associated with shorter nonsclerophyll shrubs.

I.A. A postfire transition scrub dominated by bush poppy *(Dendromecon rigida),* usually with chamise *(Adenostoma fasciculatum)* or other chaparral shrubs present. Note: Bush poppy is considered by some as a drought-deciduous species and may also be keyed in Group II of this shrub key.
***Dendromecon rigida* Alliance,**
***Dendromecon rigida* Association (3350)**

I.B. The shrubland overstory is dominated primarily by one species of shrub oak (*Quercus*) or has shared dominance with other chaparral shrub species such as chamise.

I.B.1. Scrub oak *(Quercus berberidifolia)* usually occurs as a dominant or, if it codominates, it is not codominant with chamise nor birch leaf mountain mahogany.

***Quercus berberidifolia* Alliance (2160)**

I.B.1.a. Scrub oak occurs as the sole dominant in the shrub layer. Other shrubs may occur as subdominants.

***Quercus berberidifolia* Association (2161)**

Note: This association is complex including two phases with a small but constant cover of either chamise or toyon.

***Quercus berberidifolia-Heteromeles arbutifolia* Phase (2164)**
***Quercus berberidifolia-Adenostoma fasciculatum* Phase (2163)**

I.B.1.b. Greenbark ceanothus *(C. spinosus)* characteristically occurs as a subdominant or codominant with scrub oak.

***Quercus berberidifolia-Ceanothus spinosus* Association (2167)**

I.B.2. Scrub oak codominates with chamise (chamise and scrub oak each > 15% relative cover in the shrub layer), other shrubs in the stands are significantly less cover.

***Adenostoma fasciculatum-Quercus berberidifolia* Alliance (2580)**
***Adenostoma fasciculatum-Quercus berberidifolia* Association (2581)**

I.B.3. Scrub oak *(Quercus berberidifolia)* usually occurs as a codominant or subdominant with birch leaf mountain mahogany (typically both with 10% cover).

***Quercus berberidifolia-Cercocarpus betuloides* Alliance (2590)**
***Quercus berberidifolia-Cercocarpus betuloides* Association (2591)**

I.B.4. The overstory is dominated by interior live oak. Stands are uncommon and small and are at the upper elevations of the Santa Monica Mountains, usually in rocky settings.

***Quercus wislizeni* var. *frutescens* Alliance (2560)**

I.C. The overstory is dominated by lemonade berry *(Rhus integrifolia),* holly leaf cherry *(Prunus ilicifolia),* sugar bush *(Rhus ovata),* or toyon *(Heteromeles arbutifolia),* and the shrubs may have shared dominance with other evergreen, coastal scrub, or succulent shrubs.

I.C.1. Lemonade berry occurs as the dominant shrub in an open to intermittent overstory while other shrubs (mostly nonchaparral coastal scrub species) may be present at low cover.

***Rhus integrifolia* Alliance (2150)**

I.C.1.a. Lemonade berry strongly dominates the shrub layer, though the shrub layer is typically open to intermittent in cover.

***Rhus integrifolia* Association (2153)**

Note: This is a complex association including four phases: one with a constant low cover of toyon; one with nearly pure shrub cover of lemonade berry; one with a postfire phase with a constant low cover of bush mallow; and one with a cover of laurel sumac and sagebrush.

***Rhus integrifolia-Heteromeles arbutifolia* Phase (2158)**
***Rhus integrifolia* Phase (2153)**
***Rhus integrifolia-Malacothamnus fasciculatus* Phase (7153)**
***Rhus integrifolia-Malosma laurina-Artemisia californica* Phase (7156)**

I.C.1.b. Lemonade berry is conspicuous in the shrub layer but regularly has smaller, usually drought-deciduous coastal scrub shrubs associating with it.

I.C.1.b.i. California sagebrush and/or ashy buckwheat are subdominants and may occur in equal to higher cover (in total) to lemonade berry.

***Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Association (7157)**

Note: This is a complex association including three phases that contain lemonade berry mixed with drought deciduous shrubs; one with California sagebrush and purple sage; one with California sagebrush and ashy buckwheat; and another, often of steep bluffs, with ashy buckwheat and low cover of coast yucca and giant coreopsis.

***Rhus integrifolia-Artemisia californica-Salvia leucophylla* Phase (2155)**
***Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Association Phase (7157)**
***Rhus integrifolia-Eriogonum cinereum-Yucca whipplei-Coreopsis gigantea* Phase (7155)**

I.C.1.b.ii. Coast prickly pear cactus and ashy buckwheat are conspicuous species associated with lemonade berry, usually of coastal bluffs along the western end of the Santa Monica Mountains and volcanic slopes above the Oxnard Plain.

***Rhus integrifolia-Opuntia* spp.-*Eriogonum cinereum* Association (2151)**

I.C.2. Holly leaf cherry occurs as a dominant or codominant shrub with other shrubs such as toyon in an open to intermittent overstory. Usually found in steep, mesic concavities or near rock outcroppings.

***Prunus ilicifolia* Alliance (2120)**

I.C.2.a. Toyon occurs as a subdominant to codominant shrub in the overstory.

***Prunus ilicifolia-Heteromeles arbutifolia* Association (2121)**

I.C.3. Toyon occurs as a codominant to dominant shrub in an open to continuous shrub overstory.

***Heteromeles arbutifolia* Alliance (2130)**

I.C.3.a. Laurel sumac frequently occurs as a subdominant or codominant shrub with toyon in the overstory, and there may have several other shrub species (including *Rhus* spp.) associated in lower cover.

***Heteromeles arbutifolia-Malosma laurina* Association (2138)**

Note: This is a complex association including five phases, each with a mixture of toyon and laurel sumac along with different shrubs as subdominants as indicated in the phase names. The *Heteromeles* phase has virtually no other major shrub species.

***Heteromeles arbutifolia-Malosma laurina-Artemisia californica-Mimulus aurantiacus* Phase (2135)**
***Heteromeles arbutifolia-Malosma laurina-Cercocarpus betuloides* Phase (2136)**
***Heteromeles arbutifolia-Malosma laurina-Quercus agrifolia* Phase (2137)**
***Heteromeles arbutifolia-Malosma laurina-Salvia mellifera-Rhus* spp. Phase (2138)**
***Heteromeles arbutifolia* Phase (2137)**

I.C.4. Sugar bush occurs as a dominant or codominant or sometimes may be subdominant to California sagebrush and/or purple sage in an open to intermittent shrub overstory with other shrub species.

***Rhus ovata* Alliance (2190)**

I.C.4.a. Sugar bush is strongly dominant with a significantly lower cover of other shrubs.

***Rhus ovata* Association (2193)**

I.C.4.b. Sugar bush tends to codominate with purple sage and/or California sagebrush.

***Rhus ovata-Salvia leucophylla-Artemisia californica* Association (2192)**

I.D. Birch leaf mountain mahogany occurs as a dominant or codominant with other chaparral shrubs.

I.D.1. Birch leaf mountain mahogany occurs as a dominant or codominant with other chaparral shrubs in an open to continuous shrub overstory.

***Cercocarpus betuloides* Alliance (2110)**

I.D.1.a. Birch leaf mountain mahogany usually occurs as a strong dominant, though shrubs such as toyon may occur as subdominants.

***Cercocarpus betuloides* Association (2114)**

I.D.1.b. Birch leaf mountain mahogany is codominant with chamise, although other shrubs may occur in lower cover, usually on upper northerly facing steep slopes adjacent to ridges.

***Cercocarpus betuloides-Adenostoma fasciculatum* Association (2115)**

I.D.1.c. Birch leaf mountain mahogany is codominant with greenbark ceanothus, usually on lower, more mesic slope positions than the former association.

***Cercocarpus betuloides-Ceanothus spinosus* Association (2113)**

I.D.1.d. Birch leaf mountain mahogany is dominant to codominant with laurel sumac and California sagebrush, usually found in coastal areas.

***Cercocarpus betuloides-Malosma laurina-Artemisia californica* Association (2117)**

Note: This association is complex and includes two phases, one where laurel sumac is more of a clear codominant with birch leaf mountain mahogany while California sagebrush is subdominant, and another where laurel sumac and sagebrush

are subdominant and *Melica imperfecta* is a conspicuous understory grass.

***Cercocarpus betuloides-Malosma laurina* Phase (2117)**
***Cercocarpus betuloides-Malosma laurina-Artemisia californica/Melica imperfecta* Phase (2111)**

I.E. Laurel sumac usually occurs as a codominant to dominant in an open to intermittent shrub overstory often with nonsclerophyllous shrubs such as California buckwheat, black sage *(Salvia mellifera),* or California sagebrush.

***Malosma laurina* Alliance (2140)**

I.E.1. Laurel sumac is strongly dominant with significantly lower cover of all other shrub species, usually forming an open to intermittent shrub cover.

***Malosma laurina* Association (7142)**

Note: This association includes a phase where annual grasses and herbs predominate in the understory, and another phase where the herbaceous layer is low in cover.

***Malosma laurina*/Annual Grass-Herb Phase (2145)**
***Malosma laurina* Phase (7142)**

I.E.2. California buckwheat occurs as a codominant short shrub along with the taller laurel sumac. Other shrubs may occur at low cover.

***Malosma laurina-Eriogonum fasciculatum* Association (21423)**

Note: This complex association includes three phases: one with other coastal sage species such as California sagebrush, one with essentially only the two nominate species in the shrub layer, and another with chaparral species such as big pod ceanothus as low cover associates.

***Malosma laurina-Eriogonum fasciculatum-Artemisia californica*/Annual Grass-Herb Phase (3382)**
***Malosma laurina-Eriogonum fasciculatum* Phase (21423)**
***Malosma laurina-Eriogonum fasciculatum-Heteromeles arbutifolia-Ceanothus megacarpus* Phase (3383)**

I.E.3. Black sage is usually codominant or a major subdominant shrub with laurel sumac. Ashy buckwheat is not present in significant cover.

***Malosma laurina-Salvia mellifera* Association (2148)**

I.E.4. Sugar bush and big pod ceanothus are constant subdominants with laurel sumac.

***Malosma laurina-Rhus ovata-Ceanothus megacarpus* Association (21415)**

I.E.5. Ashy buckwheat is a codominant to subdominant with laurel sumac. Several other shrubs may be associated at lower cover.

***Malosma laurina-Eriogonum cinereum* Association (2141)**

Note: This complex association includes five phases each with different subdominants or, in one case, only with the two nominate species as codominants. At least two are postfire phases indicated by the presence of either bush mallow or deerweed.

***Malosma laurina-Eriogonum cinereum-Lotus scoparius* Phase (7144)**
***Malosma laurina-Eriogonum cinereum-Salvia mellifera* Phase (7141)**
***Malosma laurina-Malacothamnus fasciculatus-Eriogonum cinereum-Salvia mellifera* Phase (7146)**
***Malosma laurina-Rhus integrifolia-Eriogonum cinereum-Artemisia californica* Phase (21413)**
***Malosma laurina-Eriogonum cinereum* Phase (2141)**

I.E.6. Laurel sumac codominates or dominates with California sagebrush. Stands may or may not include purple sage as a subdominant.

***Malosma laurina-Artemisia californica* Association (7148)**

Note: This complex association may include stands where purple sage occurs as a subdominant along with the other two nominate shrubs or stands where the nominate species are the only significant shrub cover.

***Malosma laurina-Artemisia californica-Salvia leucophylla* Phase (2142)**
***Malosma laurina-Artemisia californica* Phase (7148)**

I.F. A manzanita species occurs as a dominant in the shrub overstory.

I.F.1. Eastwood manzanita occurs as the sole dominant in the shrub overstory, usually making up at least two-thirds of the total shrub cover, uncommon at the upper elevations in the Santa Monica Mountains.

***Arctostaphylos glandulosa* Alliance,**
***Arctostaphylos glandulosa* Association (2550)**

I.F.2. Big berry manzanita occurs as a dominant in the shrub overstory, most common in the Simi Hills portion of the study area.

***Arctostaphylos glauca* Alliance (2540)**

I.G. The overstory is dominated by *Ceanothus* alone or in shared dominance with other broadleaf evergreen shrubs.

I.G.1. Hoary leaf ceanothus *(Ceanothus crassifolius)* usually occurs as a dominant or as a codominant with species such as laurel sumac.

***Ceanothus crassifolius* Alliance (2060)**

I.G.1.a. Hoary leaf ceanothus occurs as the sole dominant species, and other chaparral shrubs, if present, are relatively low in cover.
***Ceanothus crassifolius* Association (2063)**

I.G.1.b. Laurel sumac occurs as a subdominant to codominant in the shrub overstory.
***Ceanothus crassifolius-Malosma laurina* Association (2065)**

I.G.2. Wedge leaf ceanothus *(Ceanothus cuneatus)* occurs as the dominant in an open to intermittent shrub overstory.
***Ceanothus cuneatus* Alliance (2520)**

I.G.2.a. Wedge leaf ceanothus occurs with a constant subordinate cover of scrub oak, and stands are scattered throughout the central portion of the Santa Monica Mountains.
***Ceanothus cuneatus-Quercus berberidifolia* Association (2521)**

I.G.3. Big pod ceanothus *(Ceanothus megacarpus)* is dominant in an intermittent to continuous shrub overstory.
***Ceanothus megacarpus* Alliance (2080)**

I.G.3.a. Big pod ceanothus is the sole dominant shrub with no other species at significant cover in the stands.
***Ceanothus megacarpus* Association (2081)**

I.G.3.b. Big pod ceanothus is dominant with chamise subdominant to codominant.
***Ceanothus megacarpus-Adenostoma fasciculatum* Association (2083)**

Note: This complex association includes a phase with black sage as a subdominant along with chamise and a phase where just the two nominate species are present in the shrub layer.
***Ceanothus megacarpus-Adenostoma fasciculatum-Salvia mellifera* Phase (7083)**
***Ceanothus megacarpus-Adenostoma fasciculatum* Phase (2083)**

I.G.3.c. Big pod ceanothus occurs as a dominant along with redshank as a subdominant.
***Ceanothus megacarpus-Adenostoma sparsifolium* Association (2082)**

I.G.3.d. Big pod ceanothus occurs as a dominant with birch leaf mountain mahogany as a subdominant. May also include scrub oak in the stand.

***Ceanothus megacarpus-Cercocarpus betuloides* Association (2084)**

I.G.3.e. Big pod ceanothus dominates with a subdominance of laurel sumac. May have other shrubs in lower cover such as chamise and black sage.

***Ceanothus megacarpus-Malosma laurina* Association (2087)**

Note: This complex association includes two phases: one with chamise and other chaparral species and another with the two nominate species providing almost all of the cover.

***Ceanothus megacarpus-Malosma laurina-Adenostoma fasciculatum Mixed Chaparral* Phase (7081)**
***Ceanothus megacarpus-Malosma laurina* Phase (2087)**

I.G.3.f. Big pod ceanothus dominates with a subdominance of black sage.

Ceanothus megacarpus-Salvia mellifera Association (7085)

I.G.3.g. Big pod ceanothus dominates or codominates with chaparral mallow.

***Malacothamnus fasciculatus-Ceanothus megacarpus* Association (3288)**

I.G.3.h. Big pod ceanothus is the dominant or codominant along with the subdominant to codominant greenbark ceanothus.

***Ceanothus spinosus-Ceanothus megacarpus* Association (2091)**

I.G.4. Hairy leaf ceanothus *(Ceanothus oliganthus)* is usually dominant in an open to continuous shrub overstory, typical in mesic sites at upper elevations or interior locations in the study area.

***Ceanothus oliganthus* Alliance (2070)**

I.G.4.a. Hairy leaf ceanothus is the dominant shrub, no other species provides high cover in the shrub layer.

***Ceanothus oliganthus* Association (2072)**

I.G.4.b. Hairy leaf ceanothus is the dominant shrub, but redshank is a regular subdominant.

***Ceanothus oliganthus-Adenostoma sparsifolium* Association (2078)**

I.G.4.c. Toyon and/or sugar bush are subdominant to hairy leaf ceanothus.

***Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata* Association (2076)**

I.G.4.d. Scrub oak is subdominant to hairy leaf ceanothus.

***Ceanothus oliganthus-Quercus berberidifolia* Association (2077)**

I.G.5. Stands are dominated by the large mesophytic greenbark ceanothus.

***Ceanothus spinosus* Alliance (2090)**

I.G.5.a. Greenbark ceanothus strongly dominates the shrub overstory with only minor cover of other shrubs including toyon, holly leaf cherry, or laurel sumac.

***Ceanothus spinosus* Association (2092)**

Note: This complex association includes three phases based on the subordinate shrub species. In one case greenbark ceanothus is the sole dominant.

***Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia* Phase (2094)**
***Ceanothus spinosus-Malosma laurina* Phase (2097)**
***Ceanothus spinosus* Phase (2090)**

I.G.5.b. Greenbark ceanothus is the dominant or codominant along with the subdominant to codominant big pod ceanothus.

***Ceanothus spinosus-Ceanothus megacarpus* Association (2091)**

I.H. The overstory is dominated by chamise alone or in shared dominance with other chaparral or coastal scrub species in an open to continuous shrub canopy.

I.H.1. Chamise occurs as a dominant or as a codominant with laurel sumac, California buckwheat, big pod ceanothus, or other shrubs such as yerba santa or bush monkey flower.

***Adenostoma fasciculatum* Alliance (2010)**

I.H.1.a. Chamise occurs as a sole dominant shrub with no other constant subdominants.

***Adenostoma fasciculatum* Association (2011)**

I.H.1.b. Big pod ceanothus occurs as a codominant or subdominant with chamise.

***Adenostoma fasciculatum-Ceanothus megacarpus* Association (2019)**

I.H.1.c. California buckwheat occurs as a subdominant or codominant with chamise.

I.H.1.c.i. Chamise and California buckwheat occur in an open to intermittent shrub overstory with various mostly nonnative herbs among these two shrubs.

***Adenostoma fasciculatum-Eriogonum fasciculatum* Association (2017)**

Note: This complex association includes the postfire or postdisturbance phases.

***Adenostoma fasciculatum-Eriogonum fasciculatum*/Annual Grass-Herb Phase (2017)**

***Adenostoma fasciculatum-Lotus scoparius-Dendromecon rigida* Phase (7012)**

I.H.1.d. Laurel sumac usually occurs as a codominant with chamise.

***Adenostoma fasciculatum-Malosma laurina* Association (2013)**

I.H.1.d.i Laurel sumac and Chamise are joined with yerba santa in an open to intermittent shrub overstory over annual herbs and grasses.

***Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium*/Annual Grass-Herb Association (7018)**

I.H.1.e. Chamise is dominant to codominant with bush monkey flower.

***Adenostoma fasciculatum-Mimulus aurantiacus* Association (7013)**

I.H.1.f. Chamise is dominant and accompanied by purple sage as a subdominant to occasional codominant.

***Adenostoma fasciculatum-Salvia leucophylla* Association (2018)**

I.H.2. Eastwood manzanita is usually codominant (occasionally subdominant) with chamise in an open to continuous shrub overstory.

***Adenostoma fasciculatum-Arctostaphylos glandulosa* Alliance (2020)**

I.H.2.a. Eastwood manzanita occurs as a codominant with chamise and may have big pod ceanothus as a subdominant.

***Adenostoma fasciculatum-Arctostaphylos glandulosa* Association (2021)**

Note: Included is the variant with big pod ceanothus consistently present at low cover.

Adenostoma fasciculatum-Ceanothus megacarpus-Arctostaphylos glandulosa* Phase *(7017)

I.H.3. Big berry manzanita usually occurs as a codominant with chamise in an intermittent to continuous shrub overstory. Wedge leaf ceanothus, cup leaf ceanothus, and hoary leaf ceanothus are absent or subdominant.

***Adenostoma fasciculatum-Arctostaphylos glauca* Alliance (2530)**

***Adenostoma fasciculatum-Arctostaphylos glauca* Association (2531)**

I.H.4. Hoary leaf ceanothus usually occurs as a codominant with chamise in an open to intermittent shrub overstory locally with other shrubs including laurel sumac.

***Adenostoma fasciculatum-Ceanothus crassifolius* Alliance (2570)**

I.H.4.a. Laurel sumac characteristically occurs as a subdominant or codominant and is lower in cover than hoary leaf ceanothus and chamise.

***Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Association (2572)**

I.H.5. Wedge leaf ceanothus occurs as a codominant with chamise in an intermittent to continuous shrub overstory. Other shrubs may intermix as subdominants.

***Adenostoma fasciculatum-Ceanothus cuneatus* Alliance (2510)**

I.H.5.a Black sage and laurel sumac occur as subdominants to chamise and wedge leaf ceanothus in an intermittent to continuous shrub overstory.

***Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Alliance Association (2511)**

I.H.6. Black sage usually occurs as codominant with chamise in an open to continuous shrub overstory. Wedge leaf ceanothus is absent or, if present, < 5% relative cover.

***Adenostoma fasciculatum-Salvia mellifera* Alliance (2030)**

Note: If wedge leaf ceanothus is present at significant cover, see heading I.H.5.

I.H.6.a. Laurel sumac occurs as a subdominant.
Adenostoma fasciculatum-Salvia mellifera-Malosma laurina **Association (2035)**

I.H.6.b. Sugar bush occurs as a subdominant and is consistently lower in cover than black sage.
Adenostoma fasciculatum-Salvia mellifera-Rhus ovata **Association (2038)**

I.H.6.c. Chamise and black sage are sole principal shrubs with an open herbaceous understory composed mainly of nonnative species.
Adenostoma fasciculatum-Salvia mellifera **Association (2036)**

I.H.7. Scrub oak codominates with chamise (chamise and scrub oak each > 15% relative cover in the shrub layer), other shrubs in the stands are significantly less cover.
Adenostoma fasciculatum-Quercus berberidifolia **Alliance (2580)**
Adenostoma fasciculatum-Quercus berberidifolia **Association (2581)**

I.I. The overstory is dominated by redshank alone or in shared dominance with other chaparral (including chamise), deciduous, or succulent species in an open to continuous shrub canopy.

I.I.1. Redshank occurs as a dominant. If chamise is present, it occurs at trace cover.
Adenostoma sparsifolium **Alliance (2050)**

I.I.2. Redshank usually occurs with chamise as a codominant in an open to continuous shrub layer.
Adenostoma sparsifolium-Adenostoma fasciculatum **Alliance (2040)**

I.I.2.a. Hoary leaf ceanothus are characteristically present at > 1% cover.
Adenostoma sparsifolium-Adenostoma fasciculatum-Ceanothus crassifolius **Association (2042)**

<u>Group II.</u> Shrublands are dominated mainly by soft-leaved or succulent shrubs that are microphyllous or broad-leaved, and they include cactus, drought-deciduous, summer-deciduous, and/or cold-deciduous species. These are generally considered to be part of coastal sage scrub or other more soft-leaved shrub habitats. Chaparral species may be present but are

not dominant. Included are shrub willow *(Salix),* baccharis *(Baccharis),* buckwheat *(Eriogonum),* sagebrush *(Artemisia),* sage *(Salvia),* prickly pear *(Opuntia)*, bush mallow *(Malacothamnus),* poison oak *(Toxicodendron)*, California rose *(Rosa californica),* Canyon sunflower *(Venegasia carpesioides),* and so forth.

II.A. The shrub overstory is characterized by deciduous shrubs or by shrubs with scale-like leaves that are primarily found in riparian or wetland habitats.

II.A.1. Shrublands are characterized by the presence of scale broom *(Lepidospartum squamatum),* where scale broom is usually dominant but may be codominant or subdominant with other shrubs. These are generally found in rocky, occasionally flooded washes or floodplains.

***Lepidospartum squamatum* Alliance (2220)**

II.A.2. Shrublands are characterized by the dominance of mule fat alone or in shared dominance with other shrubs. An emergent and sparse tree layer of willows or other species may also be present.

***Baccharis salicifolia* Alliance (2210)**
***Baccharis salicifolia*-Riparian Association (2212)**

II.A.3. Shrublands in which a willow *(Salix*) is dominant, usually as a tall shrub or low tree. An emergent and sparse overstory tree layer may also be present.

II.A.3.a. Arroyo willow is the dominant species. (Note: May also be considered a tree, see tree key above.) It may be accompanied by mule fat *(Baccharis salicifolia),* laurel sumac *(Malosma laurina),* or other riparian shrubs.

***Salix lasiolepis* Alliance (1430)**

II.A.3.a.i. Laurel sumac is a subdominant to codominant with arroyo willow.

***Salix lasiolepis/Malosma laurina* Association (1433)**

II.A.3.a.ii. Mule fat is a characteristic subdominant or codominant with arroyo willow.

***Salix lasiolepis/Baccharis salicifolia* Association (1432)**

II.A.3.b. Narrow leaf willow *(Salix exigua)* dominates but is uncommon in small shrubby stands.

***Salix exigua* Alliance (3110)**

II.A.4. Shrublands in which California rose *(Rosa californica)* dominates the canopy, usually small narrow strips adjacent to other riparian vegetation.

***Rosa californica* Alliance (3010)**

II.A.5. Shrublands in which Mexican elderberry *(Sambucus mexicana)* is dominant in the overstory (although other shorter shrubs may be common). At times, the elderberry may take the form of a small tree.

***Sambucus mexicana* Alliance (3020)**

II.A.5.a. Mexican elderberry occurs over a mixture of herbaceous species including the native giant wild rye *(Leymus condensatus)* and other annual grasses and herbs.

***Sambucus mexicana/Leymus condensatus*/Annual Grass-Herb Association (3021)**

II.A.5.b. Mexican elderberry occurs with toyon and annual grasses and herbs in the understory.

***Sambucus mexicana-Heteromeles arbutifolia*/Annual Grass-Herb Association (3022)**

II.B. Shrublands are dominated by drought-deciduous or coastal succulent shrubs that are primarily in upland or mesic habitats.

II.B.1. Shrubland is usually characterized by the dominance of a species of encelia *(Encelia)* alone or in shared dominance with other shrubs. California sagebrush *(Artemisia californica)* occasionally may be dominant when encelia has at least 5 percent cover.

II.B.1.a. Shrubland in which California encelia *(Encelia californica)* is dominant or codominant in the canopy.

***Encelia californica* Alliance (3220)**

II.B.1.a.i. California encelia is the sole dominant or occurs with subdominant California buckwheat.

***Encelia californica* Association (3222)**

Note: Included is one phase with California buckwheat as subdominant and another phase in which California encelia is strongly dominant.

***Encelia californica-Eriogonum fasciculatum* Phase (3224)**
***Encelia californica* Phase (3222)**

II.B.1.a.ii. California sagebrush is characteristically subdominant to codominant with California encelia.

***Encelia californica-Artemisia californica* Association (3227)**

II.B.1.a.iii. Ashy buckwheat *(Eriogonum cinereum)* codominates or is subdominant with California encelia.

***Encelia californica-Eriogonum cinereum* Association (3225)**

II.B.1.a.iv. Laurel sumac and black sage regularly occur with and may codominate with California encelia.

***Encelia californica-Malosma laurina-Salvia mellifera* Association (3221)**

II.B.1.a.v. Lemonade berry *(Rhus integrifolia)* co-occurs as a subdominant to California encelia.

***Encelia californica-Rhus integrifolia* Association (3226)**

II.B.2. Shrubland with a succulent coastal prickly pear *(Opuntia oricola* or *littoralis)* or cholla *(Opuntia prolifera)* is dominant.

II.B.2.a. Coast prickly pear *(Opuntia littoralis)* is dominant or codominant with coastal sage scrub species and other cactus species.

***Opuntia littoralis* Alliance (2410)**

II.B.2.a.i. A mixture of *Opuntia* species (*littoralis, oricola,* and/or *prolifera*) may be present along with other coastal sage scrub species (*Eriogonum* spp., *Encelia californica, Artemisia californica,* etc.).

***Opuntia* spp.-Mixed Coastal Sage Scrub Association (2412)**

II.B.3. Shrubland in which giant coreopsis *(Coreopsis gigantea) is* dominant or codominant in the shrub overstory.

***Coreopsis gigantea* Alliance (3340)**

II.B.3.a. Giant coreopsis is codominant to dominant with California sagebrush and ashy buckwheat. Generally found on sea bluffs and steep slopes within one kilometer of the ocean but may extend a few kilometers inland when directly adjacent to the Conejo Plain.

***Coreopsis gigantea-Artemisia californica-Eriogonum cinereum* Association (3345)**

II.B.3.b. Giant coreopsis dominates or codominates with dune goldenbush and California encelia. Usually on sandy soils of dunes or slopes adjacent to the ocean, mostly localized around Point Dume.

***Coreopsis gigantea-Ericameria ericoides-Encelia californica* Association (3342)**

II.B.4. Shrubland in which California sagebrush *(Artemisia)* is dominant or codominant with white sage, black sage, California buckwheat, or laurel sumac in the canopy. The shrub canopy is sometimes over a higher cover of annual or perennial herbs such as bromes *(Bromus)*, cryptantha *(Cryptantha)*, stork's bill *(Erodium),* etc.

II.B.4.a. California sagebrush is codominant with California buckwheat and sometimes also with laurel sumac.

***Artemisia californica-Eriogonum fasciculatum* Alliance (3370)**

II.B.4.a.i. California sagebrush and California buckwheat usually codominate in the canopy.

***Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Association (3371)**

II.B.4.a.ii. California buckwheat and purple sage occur as subdominants to codominants with California sagebrush.

***Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla* Association (3372)**

II.B.4.a.iii. California buckwheat is usually codominant with California sagebrush, while black sage is subdominant to codominant.

***Artemisia californica-Eriogonum fasciculatum-Salvia mellifera* Association (3373)**

II.B.4.b. California sagebrush is codominant with purple sage, and sometimes other shrubs may also be codominant.

***Salvia leucophylla* Alliance (3310)**

II.B.4.b.i. California sagebrush and purple sage are the sole dominants in the shrub canopy.

***Salvia leucophylla-Artemisia californica* Association (3391)**

Note: Included is a phase with giant wild rye at moderate cover and a phase in which the nominate species are the only species of significant cover.

***Salvia leucophylla-Artemisia californica/Leymus condensatus* Phase (3393)**
***Salvia leucophylla- Artemisia californica* Phase (3391)**

II.B.4.b.ii. California sagebrush and purple sage codominate, while ashy buckwheat is usually subdominant and *Nassella* sp. is characteristic of the herb layer.

***Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella* sp. Association (3396)**

Note: Included are the following three phases: one of which has ashy buckwheat along with the codominants, and two have the following shrub species:

***Salvia leucophylla-Artemisia californica-Malosma laurina/Nassella* sp. Phase (3395)**
***Salvia leucophylla-Artemisia californica-Mimulus aurantiacus* Phase (3392)**
***Salvia leucophylla- Artemisia californica-Eriogonum cinereum/Nassella* sp. Phase (3396)**

II.B.4.c. California sagebrush is the sole dominant species in the canopy, or it is sometimes codominant with laurel sumac, ashy buckwheat, or bush monkey flower. A higher cover of annual or perennial herbs such as bromes *(Bromus)* may be present.

***Artemisia californica* Alliance (3210)**

II.B.4.c.i. California sagebrush is the sole dominant species in the shrub canopy, stands may be open to dense with a sparse to dense understory of herbaceous species.

***Artemisia californica* Association (8213)**

Note: This complex association includes three phases that may be distinguished by the additional species or species groups in the epithets. In the two shrub phases, the associated species are characteristic but relatively low in cover.

***Artemisia californica*/Annual Grass-Herb Phase (8213)**
***Artemisia californica-Salvia leucophylla* Phase (3211)**
***Artemisia californica-Malosma laurina* Phase (3219)**

II.B.4.c.ii. Giant wild rye is a conspicuous understory species (may be as tall as California sagebrush) while California sagebrush is the main cover in the shrub overstory.

***Artemisia californica/Leymus condensatus* Association (3216)**

II.B.4.c.iii. Ashy buckwheat is a subdominant to codominant with California sagebrush. Bush monkey flower and the understory grass *Melica imperfecta* may be present.

***Artemisia californica-Eriogonum cinereum* Association (3214)**

Note: This complex association includes a phase with just the two nominate species as the major species and a phase where bush monkey flower and *Melica imperfecta* are subdominant species.

***Artemisia californica-Eriogonum cinereum-Mimulus aurantiacus/Melica imperfecta* Phase (3218)**
***Artemisia californica-Eriogonum cinereum* Phase (3214)**

II.B.4.c.iv. Bush monkey flower occurs as the principle codominant or subdominant with California sagebrush. If ashy buckwheat is present, it is at trace cover only.

***Artemisia californica-Mimulus aurantiacus* Association (8214)**

II.B.5. Shrubland in which a sage *(Salvia)* species is dominant in the canopy or codominant with California buckwheat or brittlebush.

II.B.5.a. White sage is present in the canopy, usually subdominant to codominant with California buckwheat. Other shrubs may be present at relatively low cover such as California sagebrush, laurel sumac, etc.

***Eriogonum fasciculatum-Salvia apiana* Alliance,**
***E. fasciculatum-S. apiana* Association (3410)**

II.B.5.b. Black sage is usually dominant in the shrub canopy but may codominate with California sagebrush, deerweed *(Lotus scoparius),* sugar bush *(Rhus ovata),* or ashy buckwheat

***Salvia mellifera* Alliance (3320)**

II.B.5.b.i. Black sage is dominant in the shrub overstory but may occur with subdominant chamise, bush mallow, or California buckwheat.

***Salvia mellifera* Association (3324)**

Note: This complex association includes a pure phase where black sage is strongly dominant, a phase in which chamise occurs as a low-cover subdominant, a postfire phase with bush mallow, and a phase with low cover of California buckwheat.

***Salvia mellifera* Phase (3324)**
***Salvia mellifera-Adenostoma fasciculatum* Phase (3329)**
***Salvia mellifera-Malacothamnus fasciculatus* Phase (3322)**
***Salvia mellifera-Eriogonum fasciculatum* Phase (3321)**

II.B.5.b.ii. Laurel sumac is subdominant to codominant in the shrub overstory, while stands may also include low cover of lemonade berry and California sagebrush.

***Salvia mellifera-Malosma laurina* Association (8324)**

Note: This complex association has been divided into two phases: one in which the nominate species alone prevail and the other based on the low cover of the characteristically associated lemonade berry.

Salvia mellifera-Malosma laurina* Phase *(8324)
***Salvia mellifera-Artemisia californica-Rhus integrifolia* Phase (8322)**

II.B.5.b.iii. Sugar bush is subdominant to codominant in the shrub overstory.

***Salvia mellifera-Rhus ovata* Association (8325)**

II.B.5.b.iv. Ashy buckwheat occurs as a subdominant to codominant with black sage.

***Salvia mellifera-Eriogonum cinereum* Association (3323)**

II.B.5.b.v. California sagebrush is subdominant to codominant with black sage; stands may include subdominant purple sage.

***Salvia mellifera-Artemisia californica* Association (8321/3421)**

Note: This association includes one phase where purple sage occurs as a subdominant.

***Salvia mellifera-Artemisia californica-Salvia leucophylla* Phase (8323)**

II.B.5.c. Black sage usually occurs as codominant with chamise in an open to continuous shrub overstory.

***Adenostoma fasciculatum-Salvia mellifera* Alliance (2030)**

(For associations in this alliance, see heading I.H.6. in class B, group I [chaparral] of the shrub key above.)

II.B.5.d. Purple sage is the dominant shrub or may be codominant with ashy buckwheat.

***Salvia leucophylla* Alliance (3310)**

II.B.5.d.i. Purple sage is dominant in the shrub layer but may be accompanied by lower cover of several other species including ashy buckwheat, California sagebrush, bush mallow, or understory species of native and nonnative grasses and herbs.

***Salvia leucophylla* Association (3316)**

Note: This complex association includes the following three phases in which other grasses and shrubs may be present as subdominants and the last phase in which only purple sage is significant in the stands.

***Salvia leucophylla/Leymus condensatus* Phase (3319)**
***Salvia leucophylla/Nassella* spp. Phase (3311)**
***Salvia leucophylla-Artemisia californica-Malacothamnus fasciculatus* Phase (8311)**
***Salvia leucophylla* Phase (3315)**

II.B.5.d.ii. Ashy buckwheat occurs as a subdominant or codominant with purple sage, usually in an open to intermittent canopy with annual species in the understory.

***Salvia leucophylla-Eriogonum cinereum*/Annual Grass-Herb Association (3312)**

II.B.5.d.iii. California sagebrush occurs as a codominant with purple sage.

***Salvia leucophylla* Alliance, *Salvia leucophylla-Artemisia californica* Associations**

(For associations in this alliance, see heading II.B.4.b. in class B, group II [coastal sage scrub] of the shrub key above.)

II.B.6. Shrubland in which a buckwheat *(Eriogonum)* species is dominant in the canopy or is codominant with black sage, laurel sumac, bush mallow, or white sage. The shrub canopy is sometimes over a higher

cover of annual or perennial herbs such as bromes *(Bromus),* cryptantha *(Cryptantha),* stork's bill *(Erodium),* wild oats *(Avena),* etc.

II.B.6.a. California buckwheat is dominant with other shrubs in the canopy.

***Eriogonum fasciculatum* Alliance (3240)**

II.B.6.a.i. California buckwheat is usually the dominant shrub in the canopy, from coastal to inland sites, though sometimes this buckwheat may codominate with deerweed *(Lotus scoparius).*

***Eriogonum fasciculatum* Association (3241)**

Note: Included is a postfire/disturbance phase with deerweed subdominant to codominant and a phase in which California buckwheat is the sole dominant.

***Eriogonum fasciculatum-Lotus scoparius* Phase (3249)**
***Eriogonum fasciculatum* Phase (3241)**

II.B.6.a.ii. California buckwheat is dominant, and black sage and laurel sumac occur as subdominants.

***Eriogonum fasciculatum-Salvia mellifera-Malosma laurina* Association (3248)**

II.B.6.b. Ashy buckwheat occurs as the dominant low shrub but may be mixed with lower cover of other shrubs such as bush mallow *(Malacothamnus fasciculatus).*

***Eriogonum cinereum* Alliance (3250)**

II.B.6.b.i. Ashy buckwheat dominates with a variable cover of annual and perennial herbs and grasses.

***Eriogonum cinereum* Association (3257)**

Note: Included is the postfire phase and a phase in which ashy buckwheat is the strong dominant.

***Eriogonum cinereum-Malacothamnus fasciculatus/Leymus condensatus* Phase (3259)**
***Eriogonum cinereum* Phase (3257)**

II.B.7. Successional shrublands in which short-lived subshrubs or shrubs of deerweed *(Lotus scoparius),* bush poppy *(Dendromecon rigida),* or bush mallow *(Malacothamnus fasciculatus)* dominate following disturbance, particularly fire. The shrub canopy is sometimes over a higher cover of annual or perennial herbs such as bromes *(Bromus),*

common sand aster *(Lessingia filaginifolia),* needlegrass *(Nassella)*, stork's bill, wild oats, etc.

II.B.7.a. Deerweed *(Lotus scoparius)* is the dominant subshrub species in the canopy.

***Lotus scoparius* Alliance,**
***Lotus scoparius* Association (3270)**

Note: Included are the following two phases:
***Lotus scoparius-Artemisia californica*/Annual Grass-Herb Phase (3273)**
***Lotus scoparius-Malacothamnus fasciculatus-Adenostoma fasciculatum-Salvia mellifera* Phase (3272)**

II.B.7.b. Bush mallow *(Malacothamnus fasciculatus)* is the dominant or codominant shrub species in the canopy. It may be associated with a variety of chaparral or coastal scrub species, which may be subdominant to codominant. These stands typically arise following fire events and do not persist for more than a decade or so.

***Malacothamnus fasciculatus* Alliance (3280)**

II.B.7.b.i. Stands strongly dominated by bush mallow with no other significant cover by shrub species.

***Malacothamnus fasciculatus* Association (3287)**

II.B.7.b.ii. Bush mallow associated with subdominant or codominant greenbark ceanothus.

***Malacothamnus fasciculatus-Ceanothus spinosus* Association (3289)**

II.B.7.b.iii. Bush mallow associated with subdominant or codominant big pod ceanothus.

***Malacothamnus fasciculatus-Ceanothus megacarpus* Association (3288)**

II.B.7.b.iv. Bush mallow is associated with subdominant laurel sumac.

***Malacothamnus fasciculatus-Malosma laurina* Association (3286)**

II.B.7.b.v. Bush mallow is associated with subdominant to codominant purple sage and often with subdominant California sagebrush.

Malacothamnus fasciculatus-Salvia leucophylla **Association (3281)**

II.B.7.b.vi. Bush mallow associated with subdominant to codominant black sage.

Malacothamnus fasciculatus-Salvia mellifera **Association (3282)**

II.B.7.c. Bush poppy dominates, usually following chaparral burns (This may also be keyed in chaparral/sclerophyllous shrubland key [Group 1 A of shrub key].)

Dendromecon rigida **Alliance,**
Dendromecon rigida **Association (3350)**

II.B.8. Shrub canopy dominated by the largely locally introduced quail bush *(Atriplex lentiformis),* usually along the coastal strip near highways.

Atriplex lentiformis **Alliance (2330)**

II.B.9. Shrub canopy dominated by the low facultatively drought-deciduous bush monkey flower.

Mimulus aurantiacus **Alliance (2170)**

II.B.9.a. Bush monkey flower is dominant and often has regularly spaced large shrubs of laurel sumac.

Mimulus aurantiacus-Malosma laurina **Association (2172)**

Note: This complex association includes a phase with purple sage as subdominant with laurel sumac as well as a phase in which only the nominate species prevail in the shrub layer.

Mimulus aurantiacus-Malosma laurina-Salvia leucophylla **Phase (2172)**
Mimulus aurantiacus-Malosma laurina **Phase (2172)**

II.C. Shrublands are typically uplands, dominated by cold-deciduous or thin broad-leaved species of mesic situations.

II.C.1. Poison oak *(Toxicodendron diversilobum)* is dominant in the shrub canopy, while a variety of other shrubs and herbs may also occur at lower cover.

Toxicodendron diversilobum **Alliance (3330)**

II.C.1.a. California sagebrush and giant wild rye mix as subdominants with poison oak in these stands.

***Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Association (3331)**

II.C.1.b. Bush monkey flower is the subdominant shrub species in the canopy.

***Toxicodendron diversilobum-Mimulus aurantiacus* Association (3332)**

II.C.2. Mexican elderberry *(Sambucus mexicana)* is the dominant shrub species in the canopy, although other species such as *Salvia leucophylla, Artemisia californica*, and *Malosma laurina* may be present. At times, the elderberry may take the form of a small tree.

***Sambucus mexicana* Alliance (3020)**

II.C.2.a. Elderberry is dominant or codominant with toyon present or conspicuous.

***Sambucus mexicana-Heteromeles arbutifolia*/Annual Grass-Herb Association (3022)**

II.C.2.b. Elderberry is the dominant shrub species over the perennial giant wild rye and other annual herbs and grasses.

***Sambucus mexicana-Leymus condensatus*/Annual Grass-Herb Association (3021)**

II.C.3. Canyon sunflower, a leafy shrub of mesic slopes, conspicuous after fire, is dominant.

***Venegasia carpesioides* Alliance (4750)**

<u>Group III.</u> Vegetation dominated by microphyllous evergreen shrubs including coyote brush *(Baccharis pilularis),* cut-leaved goldenbush *(Hazardia squarrosa),* and broom *(Spartium junceum).*

III.A. Coyote brush is dominant, often with shrubs of coastal sage, such as *Artemisia californica* and *Salvia leucophylla*, as subordinates. Sometimes coyote brush is codominant, usually in disturbed areas such as old fields, road banks, and stream and ravine borders.

***Baccharis pilularis* Alliance (2310)**

III.A.1. Coyote brush dominates over a mixture of native and nonnative annual grasses and herbs.

***Baccharis pilularis*/Annual Grass-Herb Association (2311)**

III.A.2. Coyote brush dominates with California sagebrush as a subdominant. Purple sage and laurel sumac may be present.

***Baccharis pilularis-Artemisia californica* Association (2313)**

Note: Included are three phases in which one has both California sagebrush and purple sage occurring as subdominants, one has both California sagebrush and laurel sumac as subdominants, and one in which only sagebrush and coyote bush occur.

***Baccharis pilularis-Artemisia californica-Salvia leucophylla* Phase (2315)**
***Baccharis pilularis-Malosma laurina-Artemisia californica* Phase (2314)**
***Baccharis pilularis-Artemisia californica* Phase (2313)**

III.B. Cut-leaved goldenbush is the dominant low shrub usually with a mixture of herbs and grasses plus a low cover of California sagebrush and other shrubs.

***Hazardia squarrosa* Alliance (3260)**

III.B.1. Cut-leaved goldenbush dominates with a lower cover of California sagebrush usually present. Giant wild rye and/or a mixture of annual grasses and herbs may be present.

***Hazardia squarrosa-Artemisia californica* Association (3262)**

III.B.1.a. Understory is usually strongly dominated by a mixture of annual grasses and herbs; giant wild rye is absent or inconspicuous.

***Hazardia squarrosa*/Annual Grass-Herb Phase (3261)**

III.B.1.b. Herb layer is usually with a significant cover of giant wild rye.

***Hazardia squarrosa-Artemisia californica/Leymus condensatus* Phase (3262)**

III.B.2. Cut-leaved goldenbush dominates with open or intermediate cover over a herbaceous layer characterized by the native grass *Nassella pulchra* and the native annual herb *Hemizonia fasciculate*.

***Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Association (3263)**

III.C. The nonnative Spanish broom dominates stands usually closely associated with road cuts in the Santa Monica Mountains.

***Spartium junceum* Alliance (9542)**

Class C. Herbaceous Vegetation

Group I. Vegetation is dominated by mainly freshwater wetland forb species including cattail *(Typha),* rush *(Juncus),* sedge *(Carex),* spike rush *(Eleocharis),* and giant reed grass *(Arundo)* species. Woody species cover < 2% of the ground surface.

I.A. Stands are dominated with > 30% absolute cover by tall (generally > 1 m) wetland grasses and graminoids including cattails *(Typha)*, bulrushes and tules *(Scirpus),* and reeds *(Arundo donax).*

I.A.1. Vegetation of common bulrush *(S. acutus)* and/or California bulrush *(S. californicus)* provides the main cover in the herbaceous canopy.
***Scirpus acutus-Scirpus californicus* Alliance (4410)**

I.A.2. Cattails (*Typha* spp.) are dominant, usually in standing fresh or brackish water.
***Typha* spp. Alliance (4420)**

I.A.3. Dense stands are dominated by giant reed *(Arundo donax),* generally small and locally distributed along streams and creeks.
***Arundo donax* Alliance (4310)**

I.B. Stands are dominated by grasses and graminoids that are generally between 0.1–1 m tall including rushes *(Juncus)* and sedges *(Carex).*

I.B.1. A rush species, specifically common rush *(Juncus effusus),* is the sole dominant in the herb overstory.
***Juncus effusus* Alliance (4330)**

I.C. Stands are dominated (> 30% relative cover) by annual or perennial forbs.

I.C.1. Vegetation is dominated > 30% relative cover by the perennial noxious forb perennial pepperweed *(Lepidium latifolium),* occasional along creeks and valley bottoms, especially in the Malibu Creek watershed.
***Lepidium latifolium* Alliance (4780)**

Group II. Vegetation dominated mainly by upland and mesic herbaceous species including native and exotic grasses, forbs, and cryptogrammic species. If woody species are present, they cover < 10% of the ground surface.

II.A. Vegetation is dominated by a mixture of native perennial grasses and annuals, with the native grasses usually making up > 10% relative cover of the herbaceous layer.

II.A.1. Native grass component is usually mainly purple needlegrass *(Nassella pulchra),* and the annual component is a mixture of grasses and forbs.

***Nassella pulchra* Alliance (4020)**

II.A.1.a. Purple needlegrass co-occurs with < 10% cover of the low microphyllous shrub cut-leaved goldenbush.

***Nassella pulchra-Hazardia squarrosa* Association (4021)**

II.A.2. Native grass component is dominated by foothill needlegrass *(Nassella lepida)* alone or in shared dominance with other native and nonnative grasses and forbs. Stands are uncommon and may include emergent shrubs of the coastal sage scrub formation.

***Nassella lepida* Alliance (4090)**

II.A.3. Stands are usually on slopes associated with scrub or woodland vegetation dominated by the coarse, moderately tall giant wild rye.

***Leymus condensatus* Alliance (4040)**
***Leymus condensatus* Association (4041)**

II.A.4. Stands of the lowland or valley bottom species creeping wild rye *(Leymus triticoides)* are generally small and uncommon in study area.

***Leymus triticoides* Alliance (4030)**

II.B. Vegetation is dominated mainly by nonnative invasive perennial bunchgrasses.

II.B.1. Fountain grass *(Pennisetum setaceum)* occurs as the dominant species, though other species may be subdominant, usually on steep coastal bluffs or road cuts.

***Pennisetum setaceum* Alliance (4060)**

II.B.1.a. While fountain grass is dominant, native coastal shrubs such as *Coreopsis gigantea, Malosma laurina*, and *Yucca whipplei* occur as subdominants.

***Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina* Association (4061)**

II.B.2. Harding grass *(Phalaris aquatica)* is dominant with at least 40–50% relative cover, usually in old low-lying pastures and bottomland grasslands.

***Phalaris aquatica* Alliance (4070)**

II.C. Grasslands or forb lands are strongly dominated by nonnative annual grasses and forbs including red brome, ripgut brome, Italian ryegrass, wild oat, star thistle, and black mustard. There may be native species, but these may be relatively low cover.

California Annual Grassland Alliance (5000/4340)

II.C.1. Ripgut brome *(Bromus diandrus)* is abundant; however, an assortment of other herbs and grasses also usually occur in the stands including native species such as sun cup (*Camissonia* spp.), common sand aster *(Lessingia filaginifolia),* etc.

***Bromus diandrus*-Mixed Herb Association (50005)**

II.C.2. Ripgut brome *(Bromus diandrus)* is abundant or codominant with nonnative oats (*Avena barbata* and/or *A. fatua*).

***Bromus diandrus-Avena* spp. Association (50007)**

II.C.3. Wild oats *(Avena fatua)* are dominant with lower cover of all other nonnative and native species.

***Avena fatua* Association (4220)**

II.C.4. Italian ryegrass *(Lolium multiflorum)* is strongly dominant with low cover of all other nonnative and native species and is often found in low-lying portions of grasslands.

***Lolium multiflorum* Association (4210)**

II.C.5. Black mustard *(Brassica nigra)* is dominant or codominant in stands made up largely of other nonnative herbs and grasses.

II.C.5.a. Black mustard is the sole dominant.

***Brassica nigra* Association (50006)**

II.C.5.b. Ripgut brome and black mustard are both important or codominant in the stands.

***Brassica nigra-Bromus diandrus* Association (50009)**

II.C.5.c. Black mustard and star thistle *(Centaurea melitensis)* are both important or codominant in the stands.

***Brassica nigra-Centaurea melitensis* Association (50008)**

II.D. Stands of vegetation dominated by medium to tall introduced perennial herbs including fennel and *Euphorbia terracina*.

II.D.1. Sweet fennel *(Foeniculum vulgare)* dominates usually weedy stands along road cuts and steep coastal slopes but also may be found in bottomlands on the edge of the Conejo Plain.

***Foeniculum vulgare* Alliance (4760)**

II.D.2. The noxious perennial weed *Euphorbia terracina* dominates fields, fire clearance areas, and roadsides along the immediate coast.

***Euphorbia terracina* Nonnative Stands (4771)**

<u>Group III.</u> Vegetation dominated mainly by relatively low perennial forbs and graminoids of coastal, more or less, saline environments including brackish and salt marshes, sea cliffs, and dunes.

III.A. Salt marsh vegetation dominated or codominated by pickleweed (*Salicornia virginica* and/or *S. subterminalis*).

***Salicornia virginica* Alliance (4520)**

III.A.1. Pickleweed *(Salicornia virginica)* form and are open to intermittent cover over mudflats with marine filamentous algae.

***Salicornia virginica*/Algae Association (4528)**

III.A.2. *Salicornia virginica* mix as dominant, codominant, or subdominant with *Salicornia subterminalis*.

***Salicornia virginica-Salicornia subterminalis* Association (4525)**

III.A.3. *Salicornia virginica* is dominant with a constant presence of California sea blite, often seen near salt pans.

***Salicornia virginica-Suaeda taxifolia* (synonym *S. californica* var. *taxifolia)* Association (4525)**

III.A.4. *Salicornia virginica* codominates with *Jaumea carnosa* and perennial grass *Distichlis spicata.*

***Distichlis spicata-Salicornia virginica-Jaumea carnosa* Association (4527)**

Note: Two phases occur: one with lesser presence of pickleweed and one with greater presence of pickleweed.

***Distichlis spicata-Jaumea carnosa* Phase (4514)**
***Salicornia virginica-Jaumea carnosa-Distichlis spicata* Phase (4527)**

III.A.5. *Salicornia virginica* dominates with *Frankenia salina* as a constant associate.

III.A.5.a. *Frankenia salina* is > 1% and constant along with *Salicornia virginica.* Other species may occur as subdominants.

***Salicornia virginica-Frankenia salina* Association (45201)**

Note: Included are three phases: one with consistent presence and subdominance of *Batis maritima* with the *Frankenia salina,* one with consistent presence and subdominance of *Suaeda taxifolia* with the *Frankenia salina,* and one with *Suaeda taxifolia* higher in cover than *Frankenia salina.*

***Salicornia virginica-Frankenia salina-Batis maritima* Phase (4526)**
***Salicornia virginica-Frankenia salina-Suaeda taxifolia (*synonym *Suaeda californica)* Phase (4524)**
***Salicornia virginica-Suaeda taxifolia (*synonym *Suaeda californica)* Phase (45201)**

III.A.6. *Salicornia virginica* occurs with the nonnative black mustard, usually at the edge of the marsh in slightly elevated areas.

***Salicornia virginica-Brassica nigra* Association (4529)**

III.B. Salt marsh vegetation dominated by the perennial forb *Frankenia salina*, usually mixed with other saline forbs and grasses.

***Frankenia salina* Alliance (4550)**

III.B.1. *Frankenia salina* associates with the herbs *Limonium californicum* and *Salicornia* spp. and the native salt-tolerant grass *Monanthochloe littoralis.*

***Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Association (4551)**

III.C. Salt marsh and coastal low-spreading, turf-forming salt grass is the dominant species and may have emergent low shrubs and taller perennial herbs.

***Distichlis spicata* Alliance (4510)**

III.C.1. Salt grass associates with the sand-loving, coastal dune burweed.

***Distichlis spicata-Ambrosia chamissonis* Association (4511)**

III.C.2. Salt grass associates with marsh jaumea *(Jaumea carnosa)* and pickleweed *(Salicornia virginica)*.

***Distichlis spicata-Salicornia virginica-Jaumea carnosa* Association (n/a)**

Note: Two phases occur: one with lesser presence of pickleweed and one with greater presence of pickleweed.

***Distichlis spicata-Jaumea carnosa* Phase**
***Salicornia virginica-Jaumea carnosa-Distichlis spicata* Phase**

III.D. The low spreading and invasive succulent perennial sea fig (ice plant) is strongly dominant, usually on bluffs or dunes adjacent to the ocean.

***Mesembryanthemum* spp.-*Carpobrotus* spp. SemiNatural Herbaceous Alliance (4720)**

III.D.1. *Carpobrotus edulis* (sea fig) is the dominant species.

***Carpobrotus edulis* Association (4720)**

<u>Group IV.</u> Vegetation of rocky outcrops and cliffs usually dominated by low-matted spike moss, *Selaginella bigelovii,* or widely scattered but conspicuous individuals of buckwheat with spike moss.

IV.A. Spike moss occurs as intermediate to dense mat with emergent California buckwheat and sometimes other shrubs and herbs.

***Selaginella bigelovii* Alliance (4810)**

IV.A.1. *Selaginella bigelovii* dominates the low herb layer with emergent annual and perennial herbs, grasses, and a constant presence of California buckwheat at low cover.

***Selaginella bigelovii/Eriogonum fasciculatum* Association (4811)**

Tree Overstory Vegetation Descriptions

Alnus rhombifolia-Platanus racemosa Woodland/Forest Association

White Alder-California Sycamore Woodland/Forest Association
***Alnus rhombifolia* Woodland/Forest Alliance**
White Alder Woodland/Forest Alliance

Mapping Code: 1441

Local Description

Summary:
This woodland/forest association occurs on gentle to abrupt slopes with variable aspects at elevations between 7 and 202 m. It is codominated by *Alnus rhombifolia* and *Platanus racemosa* in the tree layer, *Salix lasiolepis* and *Ceanothus spinosus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 7–202 m, mean 80 m
Aspect: variable
Slope: range 0–35 degrees, mean 14 degrees
Topography (micro; macro): often concave; often bottom and lower slopes
Litter Cover: range 25–80%, mean 46.7%
Small Rock Cover: range 0–30%, mean 13.6%
Large Rock Cover: range 0–28%, mean 11.6%
Bare Ground: range 7–30%, mean 15%
Parent Material: depositional or igneous
Soil Texture: sand

Vegetation Description:
Stands of *Alnus rhombifolia-Platanus racemosa* Woodland/Forest form an open to intermittent tree layer (31–55%, mean 39.7%) with conifers at 0–15 m tall and hardwoods at 5–15 m tall, a sparse to open shrub layer (1–12%, mean 6.7%) at 0–5 m tall, and a sparse to intermittent herbaceous layer (0–46%, mean 9.7%) at 0–5 m tall. Total vegetation cover is 40–75%, mean cover is 53%.

In this association, the tree layer is dominated by *Alnus rhombifolia* and *Platanus racemosa*, and *Quercus agrifolia* and *Umbellularia californica* are frequently included in this layer at lower cover. The shrub layer is sparse to open and occasionally includes *Salix lasiolepis* and *Ceanothus spinosus. Malosma laurina* and *Baccharis salicifolia* may also be present in low cover. The herbaceous layer is diverse and includes a variety of forbs and grasses such as *Piptatherum miliaceum, Cyperus* sp., *Euphorbia terracina, Rubus ursinus, Bromus diandrus, Arundo donax, Vinca major, Foeniculum vulgare, Artemisia douglasiana,* and *Brassica nigra.*

***Alnus rhombifolia-Platanus racemosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	ALRH2-T	*Alnus rhombifolia*	100	17.1	3	35	X	X	
	PLRA	*Platanus racemosa*	100	13	5	25	X	X	
	QUAG-T	*Quercus agrifolia*	67	4.7	1	17			
	UMCA-T	*Umbellularia californica*	67	1.3	1	3			
	JUCA-T	*Juglans californica*	22	0.5	0.2	4			
Tree Understory									
	JUCA-M	*Juglans californica*	22	0.2	0.2	2			
Shrub									
	SALA6-M	*Salix lasiolepis*	44	1.2	0.2	6			
	CESP	*Ceanothus spinosus*	44	0.7	0.2	3			
	MALA6	*Malosma laurina*	33	1.4	0.2	12			
	BASA4	*Baccharis salicifolia*	33	0.8	0.2	5			
	TODI	*Toxicodendron diversilobum*	22	0.4	0.2	3			
	RICO3	*Ricinus communis*	22	0.1	0.2	1			X
	ENCA	*Encelia californica*	22	0.01	0.2	0.2			
	ERCI5	*Eriogonum cinereum*	22	0.01	0.2	0.2			
	HEAR5	*Heteromeles arbutifolia*	22	0.01	0.2	0.2			
Herb									
	PIMI3	*Piptatherum miliaceum*	44	1.4	0.2	4			X
	CYPER	*Cyperus*	33	0.3	0.2	2			
	EUTE10	*Euphorbia terracina*	22	1	2	7			X
	RUUR	*Rubus ursinus*	22	0.8	2	5			
	BRDI3	*Bromus diandrus*	22	0.6	0.2	5			X
	ARDO4	*Arundo donax*	22	0.5	0.2	4			X
	VIMA	*Vinca major*	22	0.5	0.2	4			X
	FOVU	*Foeniculum vulgare*	22	0.3	1	2			X
	ARDO3	*Artemisia douglasiana*	22	0.2	0.2	2			
	BRNI	*Brassica nigra*	22	0.01	0.2	0.2			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 9 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 4 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Euphorbia terracina, Bromus diandrus, Arundo donax, Vinca major, Foeniculum vulgare, Ricinus communis, Brassica nigra, Tropaeolum majus, Hedera helix, Raphanus sativus, Conium maculatum, Rumex crispus, Centaurea melitensis, Cirsium vulgare, Malva parviflora, Melilotus albus, Nicotiana glauca, Phoenix canariensis, Rorippa nasturtium-

aquaticum, Salsola tragus, Senecio mikanioides, Spartium junceum

Samples Used in Description: (n = 9)
rap0384, rap1482, rap2168, rap2206m, rap2457rlv, rap2569, rap2605, rap2650, rap2760

Comments:
Alnus rhombifolia and *Platanus racemosa* co-occur throughout much of the mountainous and hilly parts of south coastal California. Stands in the SAMO study area are restricted to permanently flowing creeks mostly in the coastal strip.

Phases:
None

COMMON NAME	White Alder-California Sycamore Woodland/Forest Association
SYNONYM	Southern Sycamore-Alder Riparian Woodland (Holland 1996)
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous forest
PHYSIOGNOMIC GROUP	Cold-deciduous forest
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous forest
FORMATION	Temporarily flooded cold-deciduous forest
ALLIANCE	*Alnus rhombifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is known from the Santa Monica Mountains region and western Riverside County, though it may be found in other regions in southern California with additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association occurs along riparian corridors of concave creek bottoms to lower slopes that are gentle to abrupt. It is known to occur near the coast in southern California (Ventura County) and inland within the peninsular range (western Riverside County) at elevations usually below 1800 m.

Vegetation Description:
Based on data from western Riverside County, the following information can augment the local description above. In the *Alnus rhombifolia-Platanus racemosa* Association, both tree species are codominant and may be regenerating in the understory. Other trees may also be

codominant, including *Quercus agrifolia* and *Salix laevigata*, and a variety of herb species may be present in this association.

Comments:
This association is likely to occur in other parts of south coastal California. To date, an analogous association has been recently described from western Riverside County, and a similar association of *Alnus rhombifolia-Platanus racemosa-Quercus chrysolepis* has been recently described from inland San Diego County. In addition, a similar association of *Alnus rhombifolia-Salix laevigata-Platanus racemosa* is described in lower montane of the southern Sierra Nevada below 1,000 m. Other than these three trees listed in this association, there is moderate to low constancy and cover of *Fraxinus latifolia*, *Quercus* spp., *Salix lasiolepis, Toxicodendron diversilobum,* and *Rubus ursinus.*

References:
Evens and San 2005, Holland 1986, Klein and Evens 2005, Potter 2003

Eucalyptus Woodland/Forest Alliance

Eucalyptus Woodland/Forest Alliance

Mapping Code: 9510

Local Description

Summary:
This woodland/forest alliance occurs on gentle to steep slopes with variable aspects at low elevations between 31 and 341 m. The tree layer is open to dense, and it is mainly dominated by *Eucalyptus* spp. Both shrub and herb layers are sparse to open, and they may include *Malosma laurina* and *Heteromeles arbutifolia* as shrubs and *Hirschfeldia incana* and annual grasses.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains., Western Fog Zone, Eastern Urban, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 31–341 m, mean 202.6 m
Aspect: variable
Slope: range 2–35 degrees, mean 18.7 degrees
Topography (micro; macro): variable, though more concave; mainly bottom
Litter Cover: range 65–75%, mean 70%
Small Rock Cover: range 2–5%, mean 3%
Large Rock Cover: range 0–8%, mean 3.3%
Bare Ground: range 8–25%, mean 14.3%
Parent Material: variable sediments, though more often igneous and sedimentary
Soil Texture: no data

Vegetation Description:
Stands of the *Eucalyptus* Woodland/Forest Alliance form an open to continuous tree layer (15–67% cover, mean 40.9%) with conifers at 0–15 m tall and hardwoods at 5–50 m tall. The shrub layer is sparse to open and may occur in two different strata at (0–15%, mean 3%), with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is sparse to open (0–20%, mean 5.4%) at 0–0.5 m tall. Total vegetation cover is 28–68%, mean cover is 49.4%.

In this alliance, the tree layer is dominated by *Eucalyptus* spp. *Quercus agrifolia, Platanus racemosa,* and *Pinus* (introduced species) are occasionally included in this layer at low cover. *Eucalyptus* spp. sometimes regenerates in the understory. The shrub tree layer is open and may include *Malosma laurina* and *Heteromeles arbutifolia* at low cover. The herbaceous layer is usually simple and open, and it may include *Hirschfeldia incana* and annual grasses.

***Eucalyptus* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	EUCAL-T	*Eucalyptus*	89	31.7	15.0	65.0	X	X	X
	QUAG-T	*Quercus agrifolia*	33	0.7	0.2	4.0			
	PLRA	*Platanus racemosa*	33	0.5	0.2	2.0			
	PINUS	*Pinus*	33	0.4	0.2	2.0			
Tree Understory									
	EUCAL-M	*Eucalyptus*	22	0.4	2.0	2.0			X
Shrub									
	MALA6	*Malosma laurina*	44	1.8	0.2	15.0			
	HEAR5	*Heteromeles arbutifolia*	44	0.4	0.2	2.5			
	BAPI	*Baccharis pilularis*	22	0.0	0.2	0.2			
Herb									
	UNGR	Unknown annual grass	22	2.4	2.0	20.0			
	HIIN3	*Hirschfeldia incana*	22	0.2	1.0	1.0			X

Other Noteworthy Species:
None

Nonnative Species:
Eucalyptus, Hirschfeldia incana, Vinca major, Rosmarinus officinalis, Schinus molle, Piptatherum miliaceum, Nerium oleander, Robinia, Brassica nigra, Cortaderia, Dactylis glomerata, Foeniculum vulgare, Lactuca serriola, Spartium junceum

Samples Used in Description: (n = 9)
AA0417, AA0554cc, AA0614, AA0721, AA0832, rap0053, rap0710, rap2215, rap2237

Comments:
Most stands seen appear to have originated from plantings, and regeneration around stands is taking place in some cases. However, some stands appear to be established through naturalization as well (Charlie Hohn, personal communication).

Phases:
None

COMMON NAME	Eucalyptus Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	I-Forest
PHYSIOGNOMIC SUBCLASS	I.A.-Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6.-Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N.-Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b.-Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Eucalyptus* Woodland/Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK Nonnative

Global Description

Distribution:

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands occur in various settings, usually the result of plantings. Most stands in California are below 1,000 m in elevation and are west of the Cascade-Sierra Divide.

Vegetation Description:
Stands are strongly dominated by *Eucalyptus* spp. Coastal stands tend to develop a seminatural understory with *Toxicodendron diversilobum* and other native shade-tolerant shrubs.

Comments:
This alliance is composed of vegetation types that are dominated by species not native to the western United States. Nine species of *Eucalyptus* are included in this alliance in California; none of them are native to North America. A description can be developed in the future for this alliance should it prove useful to do so.

References:
Sawyer and Keeler-Wolf 1995

Juglans californica/Annual Grass-Herb Woodland/Forest Association

California Walnut/Annual Grass-Herb Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1312

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes with variable aspects at low elevations between 119 and 461 m. It is dominated by *Juglans californica* in the tree layer and a variety of forbs and grasses in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 119–461 m, mean 310 m
Aspect: variable
Slope: range 15–38 degrees, mean 25 degrees
Topography (micro; macro): variable but often undulating; lower to top slopes
Litter Cover: range 75–85%, mean 80%
Small Rock Cover: range 0–15%, mean 5.4%
Large Rock Cover: range 0–2%, mean 0.8%
Bare Ground: range 2–30%, mean 15%
Parent Material: often sedimentary, occasionally igneous or depositional
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Juglans californica*/Annual Grass-Herb Woodland/Forest form a sparse to intermittent tree layer (5–45%, mean 21.5%) with hardwoods at 2–10 m tall, a sparse to open shrub layer (0–15%, mean 5.7%) at 0–10 m tall, and an open to intermittent herbaceous layer (12–45%, mean 30.8%) at 0–1m tall. Total vegetation cover is 37–65%, mean cover is 54.9%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* is occasionally included in this layer. The shrub layer is sparse to open and occasionally includes *Artemisia californica, Malosma laurina,* and *Toxicodendron diversilobum*. The herbaceous layer is diverse and includes *Brassica nigra, Leymus condensatus, Bromus* sp., *Bromus diandrus, Marah macrocarpus, Centaurea melitensis, Galium aparine, Marrubium vulgare,* and a variety of other native and nonnative species.

***Juglans californica*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	100	18.5	5	45	X	X	
	QUAG-T	*Quercus agrifolia*	50	1.4	0.2	6			
Shrub									
	ARCA11	*Artemisia californica*	44	0.7	0.2	2.5			
	MALA6	*Malosma laurina*	44	0.6	0.2	3			
	TODI	*Toxicodendron diversilobum*	44	0.3	0.2	3			
	HEAR5	*Heteromeles arbutifolia*	31	1.3	2.5	6			
	SALE3	*Salvia leucophylla*	25	1	0.2	10			
	HASQ2	*Hazardia squarrosa*	25	0.8	0.2	7			
Herb									
	BRNI	*Brassica nigra*	56	3.2	0.2	25			X
	LECO12	*Leymus condensatus*	50	1.3	1	4			
	BROMU	*Bromus*	38	7.6	10	35			
	BRDI3	*Bromus diandrus*	31	6.3	4	35			X
	MAMA8	*Marah macrocarpus*	31	0.3	0.2	4			
	CEME2	*Centaurea melitensis*	31	0.3	0.2	2.5			X
	GAAP2	*Galium aparine*	25	0.8	0.2	6			X
	MAVU	*Marrubium vulgare*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 16 of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Galium aparine, Marrubium vulgare, Erodium, Stellaria media, Brassica, Hirschfeldia incana, Avena fatua, Avena barbata, Cirsium vulgare, Malva parviflora, Urtica urens, Bromus hordeaceus, Carduus pycnocephalus, Lactuca serriola, Nicotiana glauca

Samples Used in Description: (n = 16)
AA0108cc, AA0151cc, AA0313cc, AA0321cc, AA0612, AA0932, AA0991, rap0619, rap0621, rap0702, rap0703, rap1072, rap1506m, rap1950, rap2082, rap2608

Comments:
As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent. This type is often found in disturbed and urban settings.

Phases:
None

COMMON NAME California Walnut/Annual Grass-Herb Woodland/Forest Association
SYNONYM None
PHYSIOGNOMIC CLASS Woodland

PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to be restricted to the Santa Monica Mountains and other parts of the western Los Angeles Basin of California. Higher-quality stands have a relatively high native to nonnative understory species component.

References:
Holland 1986

Juglans californica/Artemisia californica/Leymus condensatus Woodland/Forest Association

California Walnut/California Sagebrush/Giant Wild Rye Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1317

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at low elevations between 41 and 500 m. It is dominated by *Juglans californica* in the tree layer, *Artemisia californica* in the understory shrub layer, and *Leymus condensatus* in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 41–500 m, mean 311.5 m
Aspect: variable, but often northeast or northwest
Slope: range 2–42 degrees, mean 29.5 degrees
Topography (micro; macro): variable but often undulating or convex; lower to top slopes
Litter Cover: range 2–40%, mean 21%
Small Rock Cover: range 15–20%, mean 16%
Large Rock Cover: range 0–8%, mean 2.2%
Bare Ground: range 20–40%, mean 29%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Juglans californica/Artemisia californica/Leymus condensatus* Woodland/Forest form a sparse to intermittent tree layer (5–36%, mean 20.3%) with hardwoods at 2–10 m tall, a sparse to intermittent shrub layer (5–47%, mean 28.2%) at 0–5 m tall, and a sparse to open herbaceous layer (0–30%, mean 7.5%) at 0–2 m tall. Total vegetation cover is 40–70%, mean cover is 53.5%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* and *Platanus racemosa* are occasionally included in this layer. The shrub layer is sparse to intermittent and often includes *Artemisia californica*. Frequently, *Salvia leucophylla*, *Toxicodendron diversilobum,* and *Malosma laurina* are also included. A variety of other shrubs is also present in lower cover. The herbaceous layer is diverse and is dominated by *Leymus condensatus.* Other herbs include *Centaurea melitensis, Hirschfeldia incana,* and a variety of native and nonnative grasses and forbs.

Juglans californica/Artemisia californica/Leymus condensatus

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	79	15.1	1	35	X	X	
	QUAG-T	*Quercus agrifolia*	29	0.6	1	3			
Tree Understory									
	JUCA-M	*Juglans californica*	29	4.3	2	35			
Shrub									
	ARCA11	*Artemisia californica*	96	6.3	2	30		X	
	SALE3	*Salvia leucophylla*	63	6.5	0.2	28			
	TODI	*Toxicodendron diversilobum*	50	3.2	0.2	25			
	MALA6	*Malosma laurina*	50	1	0.2	5			
	MAFA	*Malacothamnus fasciculatus*	42	2.3	0.2	15			
	MIAU	*Mimulus aurantiacus*	38	2.1	1	18			
	HEAR5	*Heteromeles arbutifolia*	29	0.6	0.2	4			
	SAME5	*Sambucus mexicana*	29	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	25	0.9	0.2	9			
	BAPI	*Baccharis pilularis*	21	1.1	0.2	15			
	SAME3	*Salvia mellifera*	21	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	83	5.3	0.2	30	X	X	
	CEME2	*Centaurea melitensis*	21	0.5	0.2	5			X
	HIIN3	*Hirschfeldia incana*	21	0.1	0.2	1			X

Other Noteworthy Species:
Juglans californica was found in 24 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Nicotiana glauca, Melilotus indicus, Cortaderia, Medicago polymorpha, Bromus madritensis, Bromus tectorum, Avena barbata, Avena fatua, Erodium cicutarium, Lactuca serriola

Samples Used in Description: (n = 24)
AA0115cc, AA0286cc, AA0955, AA1095, AA1176, AA1177, rap1191, rap1369m, rap1373m, rap1511, rap1662m, rap1706, rap1943, rap1952, rap1953, rap2083, rap2204, rap2295, rap2451, rap2452, rap2459rlv, rap2617, rap2725, rap2731

Comments:
This association is one of the most common types of California walnut woodland in the project zone. It is the typical walnut/coastal sage association locally.

As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/California Sagebrush/Giant Wild Rye Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986

Juglans californica/Ceanothus spinosus Woodland/Forest Association

California Walnut/Greenbark Ceanothus Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1315

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes, usually on northeast aspects, at low elevations between 193 and 616 m. It is dominated by *Juglans californica* in the tree layer, *Ceanothus spinosus* in the understory shrub layer, and a mixture of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 193–616 m, mean 407.5 m
Aspect: variable but often northeast
Slope: range 15–42 degrees, mean 29.8 degrees
Topography (micro; macro): variable but often undulating; bottom to upper slopes
Litter Cover: no data
Small Rock Cover: range 5–35%, mean 16.7%
Large Rock Cover: range 0–2%, mean 1%
Bare Ground: range 13–55%, mean 27.7%
Parent Material: variable but more often sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Juglans californica/Ceanothus spinosus* Woodland/Forest form a sparse to intermittent tree layer (7–33%, mean 15.4%) with hardwoods at 2–10 m tall, a sparse to intermittent shrub layer (9–50%, mean 37.2%) at 0–5 m tall, and a sparse to open herbaceous layer (0–12%, mean 2.2%) at 0–2 m tall. Total vegetation cover is 38–66%, mean cover is 54.6%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* is frequently included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus spinosus*, though *Heteromeles arbutifolia* is frequently present in lower cover. Occasionally, *Rhus ovata*, *Malosma laurina, Mimulus aurantiacus, Ceanothus megacarpus,* and *Sambucus mexicana* are also included. The herbaceous layer is simple and composed of a mixture of grass and forb species in low cover such as *Leymus condensatus*, *Marah macrocarpus,* and *Melica imperfecta.*

***Juglans californica/Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	83	12	2	30	X	X	
	QUAG-T	*Quercus agrifolia*	50	0.8	0.2	3			
Tree Understory									
	JUCA-M	*Juglans californica*	22	1.8	6	13			
Shrub									
	CESP	*Ceanothus spinosus*	100	27.9	7	50	X	X	
	HEAR5	*Heteromeles arbutifolia*	72	3	0.2	15			
	RHOV	*Rhus ovata*	44	1.4	1	13			
	MALA6	*Malosma laurina*	39	0.5	0.2	4			
	MIAU	*Mimulus aurantiacus*	33	0.7	0.2	5			
	CEME	*Ceanothus megacarpus*	33	0.5	0.2	4			
	SAME5	*Sambucus mexicana*	33	0.3	0.2	2			
	PRIL	*Prunus ilicifolia*	22	0.9	2	6			
	CEBE3	*Cercocarpus betuloides*	22	0.5	0.2	4			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 18 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 18 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Nicotiana glauca, Senecio mikanioides, Bromus diandrus, Bromus hordeaceus, Avena, Euphorbia terracina, Foeniculum vulgare

Samples Used in Description: (n = 18)
AA0472cc, AA0601, AA0608, AA0671, AA1142, AA1168, AA1206, rap0476, rap0491, rap1174m, rap1742, rap2475, rap2516, rap2576, rap2590m, rap2626, rap2639, rap2925

Comments:
This California walnut association typically occurs adjacent to other north-facing slope scrubs and is probably more similar to a chaparral type with emergent walnut. It has a small proportion of *Quercus agrifolia* associated with it about half the time. Taken together, either understory or overstory *Juglans californica* occurs at 100% frequency, and cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/Greenbark Ceanothus Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986

Juglans californica/Heteromeles arbutifolia Woodland/Forest Association

California Walnut/Toyon Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 6312

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes with variable aspects (though often northeast facing) at elevations between 237 and 514 m. It is dominated by *Juglans californica* in the tree layer and *Heteromeles arbutifolia* in the understory shrub layer. A variety of grass and forbs occurs in the herbaceous layer.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 237–514 m, mean 327.1 m
Aspect: variable, but often northeast or northwest
Slope: range 15–40 degrees, mean 28 degrees
Topography (micro; macro): variable but often undulating; bottom to top slopes
Litter Cover: 75%
Small Rock Cover: range 5–15%, mean 6.8%
Large Rock Cover: range 0–2%, mean 0.2%
Bare Ground: range 5–25%, mean 16.3%
Parent Material: more often sedimentary, occasionally igneous or metamorphic
Soil Texture: moderately fine silty clay loam to fine clay but more often moderately fine clay loam

Vegetation Description:
Stands of *Juglans californica/Heteromeles arbutifolia* Woodland/Forest form a sparse to intermittent tree layer (6–58%, mean 21.6%) with conifers at 0–15 m tall and hardwoods at 2–15 m tall, a sparse to intermittent shrub layer (0–40%, mean 24.4%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–37%, mean 8.2%) at 0–1 m tall. Total vegetation cover is 25–68%, mean cover is 52.5%.

In this association, the tree layer is dominated by *Juglans californica. Quercus agrifolia* is frequently included in this layer. The shrub layer is sparse to intermittent and is dominated by *Heteromeles arbutifolia* although *Rhus ovata* and *Malosma laurina* are frequently present. Occasionally, *Ceanothus spinosus, Quercus berberidifolia, Sambucus mexicana, Salvia mellifera,* and *Artemisia californica* are also included. The herbaceous layer is diverse and includes a variety of grasses and forbs in low cover such as *Brassica nigra, Marah macrocarpus, Leymus condensatus,* and *Marrubium vulgare.*

***Juglans californica/Heteromeles arbutifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	100	15.6	5	45	X	X	
	QUAG-T	*Quercus agrifolia*	80	3.6	0.2	15		X	
Shrub									
	HEAR5	*Heteromeles arbutifolia*	95	10.1	0.2	33	X	X	
	RHOV	*Rhus ovata*	65	3.7	0.2	35			
	MALA6	*Malosma laurina*	55	1.3	0.2	4			
	CESP	*Ceanothus spinosus*	45	1.3	0.2	6			
	QUBE5	*Quercus berberidifolia*	30	1.4	0.2	12			
	SAME5	*Sambucus mexicana*	30	0.7	0.2	12			
	SAME3	*Salvia mellifera*	30	0.3	0.2	2			
	ARCA11	*Artemisia californica*	30	0.3	0.2	2.5			
	RISP	*Ribes speciosum*	25	0.2	0.2	3			
	TODI	*Toxicodendron diversilobum*	25	0.2	0.2	3			
	RHIL	*Rhamnus ilicifolia*	25	0.2	0.2	2.5			
	ENCA	*Encelia californica*	20	2.1	0.2	26			
	MIAU	*Mimulus aurantiacus*	20	0.9	0.2	12			
	LONIC	*Lonicera*	20	0.4	0.2	3			
Herb									
	BRNI	*Brassica nigra*	35	0.4	0.2	4			X
	MAMA8	*Marah macrocarpus*	30	0.2	0.2	2.5			
	LECO12	*Leymus condensatus*	20	0.6	1	5			
	MAVU	*Marrubium vulgare*	20	0.1	0.2	2			X

Other Noteworthy Species:
Juglans californica was found in 20 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Marrubium vulgare, Senecio mikanioides, Bromus diandrus, Stellaria media, Medicago polymorpha, Schinus molle, Erodium, Nicotiana glauca, Carduus pycnocephalus, Centaurea melitensis, Hirschfeldia incana, Ageratina adenophora, Galium aparine, Salsola tragus

Samples Used in Description: (n = 20)
AA0023cc, AA0109cc, AA0154cc, AA0158cc, AA0411, AA0588, AA0605, AA0929, rap0606, rap0618, rap0632, rap0701m, rap0706, rap0711, rap0715, rap0743m, rap0752m, rap2502, rap2504, rap2588

Comments:
Compared to the *Juglans californica/Ceanothus spinosus* Association, this association has a higher cover and constancy of *Quercus agrifolia* and *Heteromeles arbutifolia*. Both of these associations tend to occur on northeast-facing exposures and on disturbed sights. *H. arbutifolia* is often as tall as the walnut.

As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/Toyon Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986

Juglans californica/Malosma laurina Woodland/Forest Association

California Walnut/Laurel Sumac Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1314

Local Description

Summary:
This woodland/forest association occurs on gentle to very steep slopes on all aspects at low elevations between 20 and 460 m. It is dominated by *Juglans californica* in the tree layer, *Malosma laurina* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, Eastern Urban, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 20–460 m, mean 252.7 m
Aspect: all aspects but often northeast
Slope: range 2–50 degrees, mean 20.7 degrees
Topography (micro; macro): variable; bottom to top slopes
Litter Cover: 55%
Small Rock Cover: range 5–30%, mean 19.3%
Large Rock Cover: range 0–2%, mean 1%
Bare Ground: range 12–30%, mean 21.8%
Parent Material: more often sedimentary, occasionally igneous or depositional
Soil Texture: moderately fine sandy clay loam to fine clay

Vegetation Description:
Stands of *Juglans californica/Malosma laurina* Woodland/Forest form a sparse to intermittent tree layer (4–40%, mean 14.3%) with hardwoods at 0–15 m tall, an open to intermittent shrub layer (10–55%, mean 27.8%) at 0.5–5 m tall, and a sparse to intermittent herbaceous layer (0–41%, mean 10.9%) at 0–1 m tall. Total vegetation cover is 40–62%, mean cover is 51.2%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* and *Platanus racemosa* are occasionally found in lower cover in this layer. The open to intermittent shrub layer is dominated by *Malosma laurina.* Frequently, *Artemisia californica, Heteromeles arbutifolia,* and *Malacothamnus fasciculatus* are found in lower cover in this layer. A variety of other shrubs is also included in this layer. The herbaceous layer is diverse and includes *Leymus condensatus, Bromus* sp.*, Avena* sp.*, Erodium* sp., *Medicago polymorpha,* and *Marah macrocarpus.*

***Juglans californica/Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	75	10.4	5	40	X	X	
	QUAG-T	*Quercus agrifolia*	42	1.1	1	5			
	PLRA	*Platanus racemosa*	25	0.5	1	3			
Tree Understory									
	JUCA-M	*Juglans californica*	33	3.3	7	15			
Shrub									
	MALA6	*Malosma laurina*	100	14.8	6	25	X	X	
	ARCA11	*Artemisia californica*	58	1.2	0.2	8			
	HEAR5	*Heteromeles arbutifolia*	58	1.1	0.2	3			
	MAFA	*Malacothamnus fasciculatus*	50	3.8	0.2	15			
	SALE3	*Salvia leucophylla*	33	0.8	0.2	4			
	ERCI5	*Eriogonum cinereum*	33	0.6	0.2	4			
	TODI	*Toxicodendron diversilobum*	33	0.5	0.2	5			
	SAME5	*Sambucus mexicana*	25	0.7	0.2	8			
	MIAU	*Mimulus aurantiacus*	25	0.6	2	3			
	KECO	*Keckiella cordifolia*	25	0.2	0.2	1			
Herb									
	LECO12	*Leymus condensatus*	58	0.8	0.2	3			
	BROMU	*Bromus*	25	4.8	2	40			
	AVENA	*Avena*	25	1.6	0.2	17			X
	ERODI	*Erodium*	25	0.4	0.2	5			X
	MEPO3	*Medicago polymorpha*	25	0.2	0.2	2			X
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 12 of 12 surveys of this plant community. Regionally, the park considers this species as RarE. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Avena, Erodium, Medicago polymorpha, Bromus diandrus, Bromus hordeaceus, Bromus madritensis, Centaurea melitensis, Nicotiana glauca, Brassica, Brassica nigra, Pennisetum setaceum, Hirschfeldia incana, Euphorbia terracina, Nerium oleander, Stellaria media, Marrubium vulgare, Melilotus indicus, Ricinus communis, Schinus molle, Silybum marianum

Samples Used in Description: (n = 12)
AA0015cc, AA0183cc, rap0029, rap0170, rap0617, rap0719, rap1079, rap1141, rap1843, rap2081, rap2655, rap2767

Comments:
This association is widespread in the Santa Monica Mountains. It tends to occur on a wider range of aspects than most other associations and is the only association in this alliance that has a significant cover of *Malosma laurina.*

As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/Laurel Sumac Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Platanus racemosa South Coast Intermittent Stream Woodland/Forest Association

California Sycamore South Coast Intermittent Stream Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 6451

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with variable aspects at low elevations between 134 and 460 m. It is dominated by *Platanus racemosa* in the tree layer. The shrub and herbaceous layers are open.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Dry Inland, Eastern Urban, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 134–460 m, mean 325 m
Aspect: variable
Slope: range 2–15 degrees, mean 10.5 degrees
Topography (micro; macro): concave or flat; bottom to mid slopes
Litter Cover: 55%
Small Rock Cover: range 3–8%, mean 5.5%
Large Rock Cover: range 2–5%, mean 3.5%
Bare Ground: range 2–15%, mean 8.5%
Parent Material: variable
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Platanus racemosa* Woodland/Forest form an open to intermittent tree layer (15–59%, mean 37.3%) with hardwoods at 5–15 m tall, a sparse to open shrub layer (0–13%, mean 6.8%) at 0–5 m tall, and a sparse herbaceous layer (0–8%, mean 2.2%) at 0–1 m tall. Total vegetation cover is 28–60%, mean cover is 46.5%.

In this association, the tree layer is dominated by *Platanus racemosa*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to open and includes *Toxicodendron diversilobum, Ceanothus spinosus,* and *Heteromeles arbutifolia* in low cover. Various other shrubs also contribute to low cover. The herbaceous layer is simple and most often includes *Leymus condensatus.* Other herbs occasionally include *Artemisia douglasiana* and *Rubus ursinus*.

***Platanus racemosa* South Coast Intermittent Stream Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	33.2	15	55	X	X	
	JUCA-T	*Juglans californica*	33	1.6	2.5	7			
Tree Understory									
	JUCA-M	*Juglans californica*	33	2.4	7	7.5			
Shrub									
	TODI	*Toxicodendron diversilobum*	67	1.6	0.2	6			
	CESP	*Ceanothus spinosus*	50	1.9	2	7.5			
	HEAR5	*Heteromeles arbutifolia*	50	1.5	0.2	6			
	MIAU	*Mimulus aurantiacus*	33	0.6	1	2.5			
	RHOV	*Rhus ovata*	33	0.1	0.2	0.2			
	SAME3	*Salvia mellifera*	33	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	50	0.8	1	2.5	X		
	ARDO3	*Artemisia douglasiana*	33	0.4	0.2	2.5			
	RUUR	*Rubus ursinus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Woodwardia fimbriata was found in 1 of 6 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Ricinus communis, Schinus molle, Nicotiana glauca, Piptatherum miliaceum

Samples Used in Description: (n = 6)
AA0287cc, AA0388cc, AA0789, AA0837, rap0350, rap2250

Comments:
This is the most simple floristically of the four local California sycamore associations. It is most similar to the *Platanus racemosa-Quercus agrifolia* South Coast Association but lacks the oak.

Phases:
None

COMMON NAME	California Sycamore South Coast Intermittent Stream Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland

FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in other parts of southern coastal California and adjacent Baja California, Mexico.

Nations:
United States, Mexico (probable)

States or Provinces:
CA, Baja California

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Sawyer and Keeler-Wolf 1995

Platanus racemosa/Annual Grass-Herb Woodland/Forest Association

California Sycamore/Annual Grass-Herb Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 1456

Local Description

Summary:
This woodland/forest association occurs on flat to gentle slopes at low elevations between 34 and 140 m. It consists of *Platanus racemosa* dominating in the tree layer and *Bromus diandrus* dominating in the herbaceous layer.

Distribution:
This association is sampled in the Western Fog Zone and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 34–140 m, mean 77 m
Aspect: flat
Slope: range 0–2 degrees, mean 1.2 degrees
Topography (micro; macro): flat; bottom to lower slopes
Litter Cover: range 35–35%, mean 35%
Small Rock Cover: range 0–17%, mean 7.3%
Large Rock Cover: range 0–3%, mean 0.8%
Bare Ground: range 4–30%, mean 14.8%
Parent Material: depositional
Soil Texture: silt to fine sandy clay

Vegetation Description:
Stands of *Platanus racemosa/*Annual Grass-Herb Woodland/Forest form a sparse to open tree layer (6–22%, mean 13.2%) with conifers at 0–15 m tall and hardwoods at 10–20 m tall, a sparse shrub layer (0–2%, mean 0.4%) at 0–5 m tall, and an open to intermittent herbaceous layer (17–64%, mean 42.8%) at 0–1 m tall. Total vegetation cover is 38–68%, mean cover is 53.2%.

In this association, the tree layer is dominated by *Platanus racemosa*. The shrub layer is sparse and often includes *Malacothamnus fasciculatus*, while *Baccharis pilularis, Baccharis salicifolia, Salix lasiolepis,* and *Spartium junceum* are occasionally included at very low cover. The herbaceous layer is diverse yet often dominated by nonnative species such as *Bromus diandrus, Marrubium vulgare, Brassica nigra,* and *Cirsium vulgare.* Other herbs occasionally occurring at low cover include *Ambrosia* sp., *Arundo donax, Piptatherum miliaceum, Foeniculum vulgare,* and *Cynodon dactylon.*

***Platanus racemosa*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	12.8	6	20	X	X	
	CALOC2	*Calocedrus*	20	0.01	0.2	0.2			X
	POPUL	*Populus*	20	0.01	0.2	0.2			
	QUAG-T	*Quercus agrifolia*	20	0.01	0.2	0.2			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	20	0.01	0.2	0.2			
Shrub									
	MAFA	*Malacothamnus fasciculatus*	60	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	40	0.1	0.2	0.2			
	BASA4	*Baccharis salicifolia*	40	0.1	0.2	0.2			
	SALA6-M	*Salix lasiolepis*	40	0.1	0.2	0.2			
	SPJU2	*Spartium junceum*	40	0.1	0.2	0.2			X
	ARCA11	*Artemisia californica*	20	0.01	0.2	0.2			
	LEPID	*Lepidium*	20	0.01	0.2	0.2			
	MALA6	*Malosma laurina*	20	0.01	0.2	0.2			
	NIGL	*Nicotiana glauca*	20	0.01	0.2	0.2			X
	RHOV	*Rhus ovata*	20	0.01	0.2	0.2			
	RIBES	*Ribes*	20	0.01	0.2	0.2			
	RIMA	*Ribes malvaceum*	20	0.01	0.2	0.2			
	SAEX	*Salix exigua*	20	0.01	0.2	0.2			
	SAME5	*Sambucus mexicana*	20	0.01	0.2	0.2			
Herb									
	MAVU	*Marrubium vulgare*	80	0.2	0.2	0.2		X	X
	BRDI3	*Bromus diandrus*	60	31.2	50	55	X		X
	BRNI	*Brassica nigra*	60	1.6	0.2	7			X
	CIVU	*Cirsium vulgare*	60	0.3	0.2	1			X
	AMBRO	*Ambrosia*	40	1	0.2	5			
	ARDO4	*Arundo donax*	40	0.4	0.2	2			X
	CYDA	*Cynodon dactylon*	40	0.2	0.2	1			X
	FOVU	*Foeniculum vulgare*	40	0.2	0.2	1			X
	PIMI3	*Piptatherum miliaceum*	40	0.2	0.2	1			X
	ARDO3	*Artemisia douglasiana*	40	0.1	0.2	0.2			
	AVENA	*Avena*	40	0.1	0.2	0.2			X
	DAIN2	*Datura inoxia*	40	0.1	0.2	0.2			
	HEGR7	*Heterotheca grandiflora*	40	0.1	0.2	0.2			
	POACXX	*Poaceae*	20	3.2	16	16			
	BROMU	*Bromus*	20	2	10	10			
	AMAC2	*Ambrosia acanthicarpa*	20	0.8	4	4			
	SIMA3	*Silybum marianum*	20	0.6	3	3			X
	VISA	*Vicia sativa*	20	0.4	2	2			X
	BRHO2	*Bromus hordeaceus*	20	0.2	1	1			X
	HIIN3	*Hirschfeldia incana*	20	0.2	1	1			X
	AMPS	*Ambrosia psilostachya*	20	0.01	0.2	0.2			
	AVFA	*Avena fatua*	20	0.01	0.2	0.2			X
	BRASS2	*Brassica*	20	0.01	0.2	0.2			X

CAPY2	*Carduus pycnocephalus*	20	0.01	0.2	0.2	X
CEME2	*Centaurea melitensis*	20	0.01	0.2	0.2	X
CESO3	*Centaurea solstitialis*	20	0.01	0.2	0.2	X
ERSE3	*Eremocarpus setigerus*	20	0.01	0.2	0.2	

***Platanus racemosa*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
	ERODI	*Erodium*	20	0.01	0.2	0.2			X
	ERCI6	*Erodium cicutarium*	20	0.01	0.2	0.2			X
	GNAPH	*Gnaphalium*	20	0.01	0.2	0.2			
	LECO12	*Leymus condensatus*	20	0.01	0.2	0.2			
	PHAQ	*Phalaris aquatica*	20	0.01	0.2	0.2			X
	RASA2	*Raphanus sativus*	20	0.01	0.2	0.2			X
	SOAS	*Sonchus asper*	20	0.01	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Marrubium vulgare, Bromus diandrus, Brassica nigra, Cirsium vulgare, Arundo donax, Cynodon dactylon, Foeniculum vulgare, Piptatherum miliaceum, Avena, Spartium junceum, Silybum marianum, Vicia sativa, Bromus hordeaceus, Hirschfeldia incana, Avena fatua, Brassica, Carduus pycnocephalus, Centaurea melitensis, Centaurea solstitialis, Erodium, Erodium cicutarium, Nicotiana glauca, Phalaris aquatica, Raphanus sativus, Sonchus asper

Samples Used in Description: (n = 5)
rap0202, rap0204, rap0467, rap0495, rap2456rlv

Comments:
This association differs from other California sycamore associations locally by having a relatively high cover of *Bromus diandrus* and other nonnative annual grasses and native forbs without a significant shrub layer. This type is found on riparian terraces along the major drainages of the park.

Phases:
None

COMMON NAME	California Sycamore/Annual Grass-Herb Woodland/Forest Association
SYNONYM	Sycamore Alluvial Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association resembles some stands that were classified as Sycamore Alluvial Woodland, a rare natural community of central California.

References:
Holland 1986, Keeler-Wolf et al. 1997, Sawyer and Keeler-Wolf 1995

Platanus racemosa-Quercus agrifolia South Coast Woodland/Forest Association

California Sycamore-Coast Live Oak South Coast Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 1452

Local Description

Summary:
This woodland/forest association occurs on moderately steep to steep slopes with variable aspects at low elevations between 166 and 480 m. It is codominated by *Platanus racemosa* and *Quercus agrifolia* in the tree layer, usually as a woodland. *Heteromeles arbutifolia* is characteristically present at low cover in the understory shrub layer, and a variety of grasses and forbs is in the herbaceous layer.

Distribution:
This association is sampled in the Eastern Urban, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 166–480 m, mean 280 m
Aspect: variable
Slope: range 10–35 degrees, mean 16.9 degrees
Topography (micro; macro): often concave; bottom to mid slopes
Litter Cover: 75%
Small Rock Cover: range 2–5%, mean 3.5%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 2–5%, mean 3.5%
Parent Material: sedimentary or igneous
Soil Texture: no data

Vegetation Description:
Stands of *Platanus racemosa-Quercus agrifolia* Woodland/Forest form an open to intermittent tree layer (23–48%, mean 37.6%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (0–35%, mean 13.4%) at 0–5 m tall, and a sparse to open herbaceous layer (0–14%, mean 3.6%) at 0–1 m tall. Total vegetation cover is 40–85%, mean cover is 54.4%.

In this association, the tree layer is dominated by *Platanus racemosa* and *Quercus agrifolia*. *Juglans californica* is frequently included in this layer. The shrub layer is sparse to intermittent and often includes *Heteromeles arbutifolia, Malosma laurina,* and *Ceanothus spinosus.* Occasionally, *Toxicodendron diversilobum, Ceanothus megacarpus,* and *Baccharis pilularis* are also included. The herbaceous layer is sparse and includes *Marrubium vulgare, Marah macrocarpus,* and *Stellaria media* in low cover.

***Platanus racemosa-Quercus agrifolia* South Coast Woodland Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	16	2	25	X	X	
	PLRA	*Platanus racemosa*	100	15.1	8	25	X	X	
	JUCA-T	*Juglans californica*	50	2.8	1	10			
	EUCAL-T	*Eucalyptus*	25	0.4	0.2	3			X
	PINUS	*Pinus*	25	0.3	0.2	2			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	75	2.9	0.2	12		X	
	MALA6	*Malosma laurina*	63	3.5	0.2	15			
	CESP	*Ceanothus spinosus*	63	2.5	0.2	7.5			
	TODI	*Toxicodendron diversilobum*	38	0.8	1	3			
	CEME	*Ceanothus megacarpus*	38	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	25	0.4	1	2.5			
	BASA4	*Baccharis salicifolia*	25	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	25	0.3	0.2	2.5			
	MAVU	*Marrubium vulgare*	25	0.3	0.2	2.5			X

Other Noteworthy Species:
Juglans californica was found in 5 of 8 surveys of this plant community. Regionally, the park considers this species as RarE. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Marrubium vulgare, Stellaria media, Ageratina adenophora, Bromus diandrus, Carduus pycnocephalus, Cortaderia, Brassica nigra, Foeniculum vulgare, Nicotiana glauca, Rubus discolor

Samples Used in Description: (n = 8)
AA0051cc, AA0304cc, AA0753, rap0338m, rap0633, rap0728m, rap1071, rap2340

Comments:
This association with California sycamore differs from the others in the Santa Monica Mountains by having a constant codominant presence of coast live oak, a minor herbaceous component, and moderate shrub cover composed of several species of nonriparian shrubs.

Phases:
None

COMMON NAME	California Sycamore-Coast Live Oak South Coast Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is related to the *Quercus agrifolia-Platanus racemosa/Toxicodendron diversilobum* Association of western Riverside and San Diego counties. However, in that association *Q. agrifolia* is strongly dominant.

References:
Evens and San 2005, Klein and Evens 2005

Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana South Coast Woodland/Forest Association

California Sycamore-Coast Live Oak/Mule Fat South Coast Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 1458

Local Description

Summary:
This woodland/forest association occurs on often flat to gentle and occasionally somewhat steep slopes at elevations between 0 and 414 m. While slopes are usually flat, the association may be somewhat steep with steepness on southeast or variable exposures. It is codominated by *Platanus racemosa* and *Quercus agrifolia* in the tree layer, *Baccharis salicifolia* in the understory shrub layer, and *Piptatherum miliaceum* is often in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 0–414 m, mean 184.2 m
Aspect: often flat, occasionally variable or southeast
Slope: range 0–15 degrees, mean 3.2 degrees
Topography (micro; macro): often flat, occasionally concave; bottom to lower slopes
Litter Cover: range 15–75%, mean 55%
Small Rock Cover: range 3–50%, mean 18.7%
Large Rock Cover: range 0–40%, mean 6.3%
Bare Ground: range 5–35%, mean 14.6%
Parent Material: variable but more often depositional
Soil Texture: coarse sand to fine sandy clay

Vegetation Description:
Stands of *Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana* Woodland/Forest form a sparse to intermittent tree layer (8–40%, mean 20.3%) with hardwoods at 5–20 m tall, a sparse to intermittent shrub layer (1–36%, mean 16.7%) at 0–5 m tall, and a sparse to intermittent herbaceous layer (2–35%, mean 12.2%) at 0–1 m tall. Total vegetation cover is 29–75%, mean cover is 45.3%.

In this association, the tree layer is dominated by *Platanus racemosa* and *Quercus agrifolia*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Baccharis salicifolia*. Various other shrubs such as *Toxicodendron diversilobum* and *Sambucus mexicana* are occasionally included in low cover. The herbaceous layer is diverse and often includes *Piptatherum miliaceum, Artemisia douglasiana,* and *Bromus diandrus.* Other herbs include *Hirschfeldia incana, Leymus condensatus,* and *Rubus ursinus*.

***Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana* South Coast Woodland Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	13.1	3	30	X	X	
	QUAG-T	*Quercus agrifolia*	79	4.4	0.2	15		X	
	JUCA-T	*Juglans californica*	37	1	0.2	7.5			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	32	0.6	0.2	5			
Shrub									
	BASA4	*Baccharis salicifolia*	100	7.2	1	20	X	X	
	TODI	*Toxicodendron diversilobum*	37	0.5	0.2	3			
	SAME5	*Sambucus mexicana*	32	0.4	0.2	4			
	SAME3	*Salvia mellifera*	26	0.9	0.2	10			
	MIAU	*Mimulus aurantiacus*	26	0.8	0.2	6			
	MALA6	*Malosma laurina*	26	0.7	0.2	9			
	CESP	*Ceanothus spinosus*	26	0.4	0.2	3			
	ARCA11	*Artemisia californica*	26	0.4	0.2	3			
	NIGL	*Nicotiana glauca*	26	0.1	0.2	1			X
	ROCA2	*Rosa californica*	21	0.3	0.2	6			
	MAFA	*Malacothamnus fasciculatus*	21	0.3	0.2	2.5			
	BAPI	*Baccharis pilularis*	21	0.2	0.2	3			
	BRCA3	*Brickellia californica*	21	0.1	0.2	1			
Herb									
	PIMI3	*Piptatherum miliaceum*	79	3	0.2	12		X	X
	ARDO3	*Artemisia douglasiana*	68	3.4	0.2	10			
	BRDI3	*Bromus diandrus*	58	3.5	0.2	30			X
	HIIN3	*Hirschfeldia incana*	42	0.4	0.2	3			X
	LECO12	*Leymus condensatus*	37	0.5	0.2	5			
	RUUR	*Rubus ursinus*	32	0.3	0.2	2.5			
	AMPS	*Ambrosia psilostachya*	26	0.2	0.2	1			
	FOVU	*Foeniculum vulgare*	26	0.1	0.2	1			X
	BRNI	*Brassica nigra*	21	0.01	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 9 of 19 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Bromus diandrus, Hirschfeldia incana, Foeniculum vulgare, Nicotiana glauca, Brassica nigra, Carduus pycnocephalus, Marrubium vulgare, Bromus madritensis, Conium maculatum, Melilotus officinalis, Cirsium vulgare, Bromus hordeaceus, Anagallis arvensis, Centaurea melitensis, Erodium cicutarium, Silybum marianum, Sonchus asper, Arundo donax, Anthemis cotula, Melilotus albus, Urtica urens, Raphanus sativus, Senecio mikanioides, Melilotus indicus, Vicia villosa, Avena, Cynodon dactylon, Lactuca serriola, Oxalis pes-caprae, Plantago major, Ricinus communis, Rumex crispus, Sequoia sempervirens, Sonchus oleraceus, Veronica anagallis-aquatica, Vinca major

Samples Used in Description: (n = 19)
AA0064cc, AA0346, AA0517, AA0785, AA1013, rap0199m, rap0205, rap0445, rap0447, rap1425, rap1903, rap2435, rap2458rlv, rap2619, rap2637, rap2670, rap2689, rap2911, rap2924

Comments:
This is the most widespread of the California sycamore associations in the study area, usually found in seasonal streambeds with high water fluctuation or in wide washes. In this association the sycamore dominates tree canopy with much lower cover of coast live oak. The understory is characterized by the riparian *Baccharis salicifolia* and may also include other riparian or semiriparian shrubs such as *Rosa californica* and *Sambucus mexicana*. The higher proportion of large and small surface rocks suggests a more active flooding regime than other California sycamore associations represented locally.

Phases:
None

COMMON NAME	California Sycamore-Coast Live Oak/Mule Fat South Coast Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur in other parts of south coastal California and is similar to the *Platanus racemosa-Quercus agrifolia* Central Coast Association.

References:
Keeler-Wolf et al. 1997

Platanus racemosa-Quercus agrifolia-Salix lasiolepis Woodland/Forest Association

California Sycamore-Coast Live Oak-Arroyo Willow Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 6452

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at elevations between 35 and 445 m. It is dominated by *Platanus racemosa* and *Quercus agrifolia* in the tree layer, *Salix lasiolepis* in the tree understory, *Toxicodendron diversilobum* and *Salix lasiolepis* in the shrub layer, and a variety of forbs and grasses in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 35–445 m, mean 246 m
Aspect: variable but often flat
Slope: range 2–35 degrees, mean 10.4 degrees
Topography (micro; macro): often concave, rarely flat; bottom to upper slopes
Litter Cover: range 15–70%, mean 42.6%
Small Rock Cover: range 2–40%, mean 15.2%
Large Rock Cover: range 1–45%, mean 12%
Bare Ground: range 2–40%, mean 16.1%
Parent Material: variable but more often sedimentary
Soil Texture: silt to moderately fine clay loam

Vegetation Description:
Stands of *Platanus racemosa-Quercus agrifolia-Salix lasiolepis* Woodland/Forest form an open to intermittent tree layer (12–59%, mean 35.9%) with hardwoods at 5–20 m tall, a sparse to intermittent shrub layer (0–45%, mean 13.9%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–37%, mean 5.8%) at 0–1 m tall. Total vegetation cover is 30–70%, mean cover is 50.9%.

In this association, the tree layer is dominated by *Platanus racemosa* and *Quercus agrifolia*. *Umbellularia californica, Salix laevigata,* and *Juglans californica* are occasionally included in this layer. *Salix lasiolepis* is dominant in the tree and shrub understory. The shrub layer is also dominated by *Toxicodendron diversilobum*. Occasionally, *Baccharis salicifolia, Ceanothus spinosus,* and *Heteromeles arbutifolia* are also included in the diverse shrub layer. The herbaceous layer is diverse and includes a variety of herbs such as *Piptatherum miliaceum, Artemisia douglasiana, Carduus pycnocephalus, Typha* sp., and *Leymus condensatus*.

***Platanus racemosa-Quercus agrifolia-Salix lasiolepis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	13.1	4	30	X	X	
	QUAG-T	*Quercus agrifolia*	88	9.2	0.2	40	X	X	
	UMCA-T	*Umbellularia californica*	29	1.4	0.2	16			
	SALA3-T	*Salix laevigata*	24	0.6	1	5			
	JUCA-T	*Juglans californica*	24	0.4	0.2	3			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	53	5.8	1	30	X		
Shrub									
	TODI	*Toxicodendron diversilobum*	71	4.1	0.2	20			
	SALA6-M	*Salix lasiolepis*	53	4.4	0.2	35			
	BASA4	*Baccharis salicifolia*	41	1.9	2	12			
	CESP	*Ceanothus spinosus*	35	2.2	0.2	23			
	HEAR5	*Heteromeles arbutifolia*	35	0.7	0.2	4			
Herb									
	PIMI3	*Piptatherum miliaceum*	47	1.8	0.2	20			X
	ARDO3	*Artemisia douglasiana*	35	0.7	0.2	4			
	CAPY2	*Carduus pycnocephalus*	29	0.1	0.2	1			X
	TYPHA	*Typha*	24	0.4	0.2	3			
	LECO12	*Leymus condensatus*	24	0.3	0.2	3			
	FOVU	*Foeniculum vulgare*	24	0.1	0.2	1			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 17 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 6 of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 17 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Woodwardia fimbriata was found in 1 of 17 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Carduus pycnocephalus, Foeniculum vulgare, Lactuca serriola, Bromus diandrus, Arundo donax, Dactylis glomerata, Melilotus albus, Rorippa nasturtium-aquaticum,

Spartium junceum, Myoporum laetum, Avena fatua, Brassica nigra, Conium maculatum, Cynodon dactylon, Schinus molle, Veronica anagallis-aquatica, Bromus madritensis, Cirsium vulgare, Convolvulus arvensis, Cortaderia, Ficus carica, Hirschfeldia incana, Lolium, Lotus corniculatus, Nerium oleander, Nicotiana glauca, Oxalis pes-caprae, Phalaris aquatica, Polypogon monspeliensis, Robinia, Silybum marianum, Sonchus oleraceus

Samples Used in Description: (n = 17)
AA1137, AA1188, rap0009, rap0157m, rap0355m, rap1790, rap2205m, rap2275, rap2307, rap2338, rap2427, rap2497, rap2625, rap2673, rap2682rlv, rap2769, rap2898

Comments:
Of the three of the local associations in the Santa Monica Mountains with a mixture of sycamore and coast live oak, this one seems to be more tied to permanent water. The presence of *Salix lasiolepis* and/or S. *laevigata* and the addition of *Typha* sp. in several of the stands suggest a relatively constant source of water on a gentle slope. However, this association also represents the narrow and steep ravine type of sycamore woodland at least in part of the study area. Some stands may be on steep rocky ravines and follow upslope at a substantial distance from the bases of the mountains. The presence of *Umbellularia californica* in about one-third of the samples along with the constant and frequently codominant *Q. agrifolia* suggests narrow canyon stands. Thus, this appears to be an association with variable ecological setting. It may require further refinement in its definition.

Phases:
None

COMMON NAME	California Sycamore-Coast Live Oak-Arroyo Willow Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus agrifolia South Coastal Woodland/Forest Association

Coast Live Oak South Coastal Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6122

Local Description

Summary:
This woodland/forest association occurs on gentle to steep, north-facing slopes at elevations between 0 and 636 m. It is dominated by *Quercus agrifolia* in the tree layer, *Heteromeles arbutifolia* in the understory shrub layer, and variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, Dry Inland, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–636 m, mean 325 m
Aspect: variable but often northeast and northwest
Slope: range 2–35 degrees, mean 23.0 degrees
Topography (micro; macro): variable but more often concave; bottom to top slopes
Litter Cover: range 45–95%, mean 72.9%
Small Rock Cover: range 0–30%, mean 6.4%
Large Rock Cover: range 0–15%, mean 3%
Bare Ground: range 0–35%, mean 14.7%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: medium loam to clay

Vegetation Description:
Stands of *Quercus agrifolia* Woodland/Forest form a sparse to continuous tree layer (9–73%, mean 43%) with hardwoods at 2–20 m tall, a sparse to open shrub layer (0–32%, mean 7.6%) at 0-10 m tall, and a sparse to open herbaceous layer (0–15%, mean 2.1%) at 0–2 m tall. Total vegetation cover is 19–71%, mean cover is 52.7%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Platanus racemosa, Juglans californica,* and *Umbellularia californica* are occasionally included in this layer. The shrub layer is sparse to open and occasionally includes *Heteromeles arbutifolia, Ceanothus spinosus, Mimulus aurantiacus,* and *Artemisia californica*. The herbaceous layer is diverse and occasionally includes herb such as *Leymus condensatus, Bromus diandrus,* and *Piptatherum miliaceum* in low cover.

***Quercus agrifolia* South Coastal Woodland/Forest Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	40.5	9	65	X	X	
	PLRA	*Platanus racemosa*	25	0.6	0.2	8			
	JUCA-T	*Juglans californica*	21	0.4	0.2	5			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	46	1	0.2	7			
	CESP	*Ceanothus spinosus*	42	1.1	0.2	7.5			
	MIAU	*Mimulus aurantiacus*	31	0.6	0.2	6			
	ARCA11	*Artemisia californica*	29	0.4	0.2	6			
	MALA6	*Malosma laurina*	27	0.7	0.2	6			
	TODI	*Toxicodendron diversilobum*	23	0.3	0.2	2.5			

Other Noteworthy Species:
Juglans californica was found in 11 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Piptatherum miliaceum, Carduus pycnocephalus, Brassica nigra, Centaurea melitensis, Vinca major, Ailanthus altissima, Bromus madritensis, Arundo donax, Avena, Erodium, Hirschfeldia incana, Stellaria media

Samples Used in Description: (n = 48)
AA0048cc, AA0084cc, AA0089cc, AA0193cc, AA0213cc, AA0414, AA0524, AA0532, AA0546, AA0550, AA0552, AA0585, AA0594, AA0647, AA0648, AA0660, AA0707, AA0751, AA0766, AA0774, AA0775, AA0802, AA0844, AA0845, AA0856, AA0890, AA0922, AA1012, AA1017, AA1037, AA1044, AA1107, AA1181, AA1220, rap0014m, rap0142, rap0421m, rap0583, rap0744, rap0807, rap1073, rap2187, rap2197, rap2387, rap2398, rap2478, rap2508, rap2601

Comments:
This is the generic coast live oak woodland of the Santa Monica Mountains within the south coastal region. It has no characteristic understory species in either the shrub or the herb layer. Since more than half of the samples were assessed within the stand and still did not group with other locally defined associations, it is unlikely that this is the result of several of the samples being taken from out of the stand precluding detailed assessment of the understory. In general, the relatively closed canopy, shady understory, and dense litter cover may be the cause of the indistinct understory composition.

Phases:
None

COMMON NAME	Coast Live Oak South Coastal Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland

PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is analogous to the *Quercus agrifolia* Association, in which coast live oak is the only principal indicator. This association (or suballiance, as defined by Allen et al. 1991) ranges from central coastal (San Luis Obispo County) to southern California (San Diego County).

Nations:
United States

States or Provinces:
CA

Environmental Description:
This common association occurs on lower slopes and hillsides west of the coastal divide in central and southern California. It occurs largely on west-, east-, and south-facing exposures between 100 and 400 m elevation on moderate to steep slopes. Substrate is largely rocky and/or gravelly loams over sedimentary sandstones and shales.

Vegetation Description:
The canopy is strongly dominated by *Quercus agrifolia* with generally low cover of understory species.

Comments:
This association has relatively high tree cover and low cover of understory species.

References:
Allen et al. 1991, Sawyer and Keeler-Wolf 1995

Quercus agrifolia/Adenostoma fasciculatum Woodland/Forest Association

Coast Live Oak/Chamise Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6115

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep north-facing slopes at low elevations between 0 and 612 m. It is dominated by *Quercus agrifolia* in the tree layer, *Adenostoma fasciculatum* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 0–612 m, mean 353.3 m
Aspect: variable, but often northeast and northwest
Slope: range 15–40 degrees, mean 30.5 degrees
Topography (micro; macro): often flat, occasionally undulating; lower to upper
Litter Cover: no data
Small Rock Cover: range 5–25%, mean 11.7%
Large Rock Cover: range 1–15%, mean 10.3%
Bare Ground: range 10–35%, mean 20%
Parent Material: sedimentary
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Quercus agrifolia/Adenostoma fasciculatum* Woodland/Forest form a sparse to open tree layer (0–15%, mean 8.7%) with hardwoods at 5–15 m tall, an open to intermittent shrub layer (10–58%, mean 36.8%) at 01–5 m tall, and a sparse to intermittent herbaceous layer (0–40%, mean 11.3%) at 0–0.5 m tall. Total vegetation cover is 32–60%, mean cover is 50%.

In this association, the tree layer is dominated by *Quercus agrifolia*. The open to intermittent shrub layer is dominated by *Adenostoma fasciculatum*. Frequently, *Mimulus aurantiacus, Malosma laurina, Ceanothus spinosus, Heteromeles arbutifolia,* and *Rhus ovata* are also included. The herbaceous layer is simple and occasionally includes *Melica imperfecta* and *Leymus condensatus.*

***Quercus agrifolia/Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	83	9.7	8	15	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	33	3.5	9	12			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	17.3	7	35	X	X	
	MIAU	*Mimulus aurantiacus*	83	2.3	1	5		X	
	MALA6	*Malosma laurina*	83	1.6	1	3		X	
	CESP	*Ceanothus spinosus*	67	3.7	1	10			
	HEAR5	*Heteromeles arbutifolia*	67	1	0.2	3			
	RHOV	*Rhus ovata*	50	1	1	3			
	CEBE3	*Cercocarpus betuloides*	33	2.2	1	12			
	YUWH	*Yucca whipplei*	33	0.4	0.2	2.5			
Herb									
	MEIM	*Melica imperfecta*	33	9.2	15	40			
	LECO12	*Leymus condensatus*	33	0.4	0.2	2.5			

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Brassica nigra, Centaurea melitensis, Erodium cicutarium

Samples Used in Description: (n = 6)
AA0224cc, rap0155m, rap0406, rap0470m, rap0575, rap1285m

Comments:
This association represents a transitional stage between chaparral dominated by *Adenostoma fasciculatum* and oak woodland dominated by *Quercus agrifolia*, with chamise chaparral in a marginal environmental setting such as on a northerly facing lower slope that is being colonized by oak from an adjacent stand. This type also may be associated with the presence of rocks creating microclimates such as in sandstone areas of Castro Crest or upper Simi Hills. Such situations are apparently uncommon, resulting in only a few stands sampled.

Phases:
None

COMMON NAME	Coast Live Oak/Chamise Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Similar open woodlands of short *Quercus agrifolia* over *A. fasciculatum* have been seen in other parts of California (e.g., Monterey County, T. Keeler-Wolf personal observation 2004) but have not been sampled. *Q. agrifolia*/Chaparral Association is described from western Riverside County in which the understory contains a mixture of chaparral species including *Adenostoma fasciculatum*. Further, *Q. agrifolia/Adenostoma fasciculatum-Salvia mellifera* Association is described from central California from Monterey south to Ventura County, which is quite similar to this. In this type, *Salvia mellifera* only occurs in 62% of the samples. However, it is insignificant in the Santa Monica Mountains samples. Further descriptive work may show all these types to be equivalent.

References:
Allen et al. 1991, Klein and Evens 2005

Quercus agrifolia/Annual Grass-Herb Woodland/Forest Association

Coast Live Oak/Annual Grass-Herb Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1111

Local Description

Summary:
This woodland/forest association occurs on flat to steep slopes that are often facing northwest at low elevations between 32 and 625 m. It is dominated by *Quercus agrifolia* in the tree layer and *Bromus diandrus* and other herbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, Immediate Coast, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 32–625 m, mean 312.2 m
Aspect: variable but often northwest or flat
Slope: range 0–35 degrees, mean 15.9 degrees
Topography (micro; macro): variable but more often undulating or flat; bottom to top slopes
Litter Cover: range 11–88%, mean 64.9%
Small Rock Cover: range 0–25%, mean 5.6%
Large Rock Cover: range 0–85%, mean 4.5%
Bare Ground: range 0–70%, mean 16.1%
Parent Material: depositional or sedimentary, occasionally igneous
Soil Texture: moderately fine sandy clay loam to fine clay

Vegetation Description:
Stands of *Quercus agrifolia/*Annual Grass-Herb Woodland/Forest form a sparse to intermittent tree layer (2–59%, mean 23.1%) with conifers at 0–15 m tall and hardwoods at 2–15 m tall, a sparse to intermittent shrub layer (0–41%, mean 6.8%) at 0–5 m tall, and a sparse to continuous herbaceous layer (4–70%, mean 24.1%) at 0–2 m tall. Total vegetation cover is 11–78%, mean cover is 50.1%.

In this association, the tree layer is dominated by *Quercus agrifolia*. Other trees such as *Eucalyptus* sp*., Quercus lobata,* and *Juglans californica* may infrequently be present at low cover as well. The shrub layer is sparse to intermittent and occasionally includes *Salvia leucophylla, Artemisia californica, Sambucus mexicana,* and *Malosma laurina*. The herbaceous layer is diverse and is dominated by *Bromus diandrus.* Other herbs often include *Brassica nigra, Centaurea melitensis, Marrubium vulgare, Bromus hordeaceus,* and *Avena fatua*.

***Quercus agrifolia*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	93	20.6	1	55	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	32	1.3	0.2	20			
	QUAG-L	*Quercus agrifolia*	24	0.2	0.2	3			
Shrub									
	SALE3	*Salvia leucophylla*	37	1	0.2	23			
	ARCA11	*Artemisia californica*	32	0.7	0.2	12			
	SAME5	*Sambucus mexicana*	32	0.1	0.2	1			
	MALA6	*Malosma laurina*	29	0.6	0.2	6			
	HASQ2	*Hazardia squarrosa*	29	0.3	0.2	3			
	MIAU	*Mimulus aurantiacus*	27	0.5	0.2	7			
	HEAR5	*Heteromeles arbutifolia*	24	0.4	0.2	4			
	MAFA	*Malacothamnus fasciculatus*	22	0.3	0.2	7.5			
	BAPI	*Baccharis pilularis*	20	0.4	0.2	7			
	TODI	*Toxicodendron diversilobum*	20	0.3	0.2	4			
Herb									
	BRDI3	*Bromus diandrus*	63	9.4	0.2	56	X		X
	BRNI	*Brassica nigra*	51	1.6	0.2	31			X
	CEME2	*Centaurea melitensis*	44	1.2	0.2	20			X
	MAVU	*Marrubium vulgare*	41	0.3	0.2	7			X
	BRHO2	*Bromus hordeaceus*	29	0.9	0.2	15			X
	AVFA	*Avena fatua*	27	0.8	0.2	20			X
	LECO12	*Leymus condensatus*	27	0.5	0.2	12			
	HIIN3	*Hirschfeldia incana*	27	0.5	0.2	8			X
	MEIN2	*Melilotus indicus*	27	0.4	0.2	10			X
	SIMA3	*Silybum marianum*	22	0.1	0.2	2			X
	BROMU	*Bromus*	20	2.5	6	23			
	BRMA3	*Bromus madritensis*	20	0.6	0.2	15			X
	CIVU	*Cirsium vulgare*	20	0.2	0.2	2			X
	MAMA8	*Marah macrocarpus*	20	0.1	0.2	2			

Other Noteworthy Species:
Brodiaea jolonensis was found in 1 of 41 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Calochortus catalinae was found in 1 of 41 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Delphinium parryi was found in 1 of 41 surveys of this plant community, which may be the rare *D. parryi* subsp. *blochmaniae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2. Federal listing is Species of Concern, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 5 of 41 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Brassica nigra, Centaurea melitensis, Marrubium vulgare, Bromus hordeaceus, Avena fatua, Hirschfeldia incana, Melilotus indicus, Silybum marianum, Bromus madritensis, Cirsium vulgare, Galium aparine, Erodium cicutarium, Lactuca serriola, Avena barbata, Medicago polymorpha, Sonchus oleraceus, Lolium, Carduus pycnocephalus, Malva parviflora, Avena, Stellaria media, Piptatherum miliaceum, Anagallis arvensis, Sisymbrium, Picris echioides, Conyza canadensis, Foeniculum vulgare, Phalaris aquatica, Nicotiana glauca, Rumex crispus, Schinus molle, Sonchus asper, Chenopodium ambrosioides, Cynodon dactylon, Tamarix, Anthriscus caucalis, Centaurea solstitialis, Erodium, Erodium botrys, Erodium moschatum, Hypochaeris, Melilotus officinalis, Myoporum laetum, Raphanus sativus, Salsola tragus, Vicia villosa

Samples Used in Description: (n = 41)
AA0043cc, AA0099cc, AA0225cc, AA0353, AA0460cc, AA0465cc, AA0543, AA0583, AA0689, AA0804, AA0815, AA0910, AA0941, AA1120, AA1189, rap0206, rap0401m, rap0403m, rap0854, rap0956, rap1311, rap1312, rap1321, rap1327, rap1619, rap1635, rap1731, rap1896, rap1928, rap2157, rap2354, rap2392, rap2462rlv, rap2463rlv, rap2556rlv, rap2578, rap2678, rap2751rlv, rap2851rlv, rap2852rlv, rap2854rlv

Comments:
This association is the common live oak/grass association in the study area. It has been described elsewhere for California.

Phases:
None

COMMON NAME	Coast Live Oak/Annual Grass-Herb Woodland/Forest Association
SYNONYM	Coast Live Oak/Grass (Allen et al. 1991)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	

Global Description

Distribution:
This association is known from much of central and southern coastal California. This association is known from Solano to San Diego counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association occupies virtually all aspects and slope steepness (0–32 degrees) between 50 and 700 m elevation. Substrate texture is variable, and stands typically occur on sandstones and shales.

Vegetation Description:
The *Quercus agrifolia* overstory is variable in cover from open to continuous cover. The herbaceous layer is usually intermittent to open, especially with forbs (e.g., *Brassica* spp., *Claytonia perfoliata,* and *Lupinus* spp.) and nonnative annual grasses (e.g., *Bromus diandrus, B. hordeaceus,* and *Vulpia* spp.).

Comments:
This association was originally named *Quercus agrifolia*/Grass by Allen et al. (1991) from Solano to Monterey counties, though it has been documented elsewhere in southern California as well as central California. It is called *Quercus agrifolia*/Annual Grass-Herb herein to better describe the annual nature of the understory.

References:
Allen et al. 1991, Evens and San 2005, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Quercus agrifolia/Ceanothus spinosus Woodland/Forest Association

Coast Live Oak/Greenbark Ceanothus Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1118

Local Description

Summary:
This woodland/forest association occurs on gentle to steep north-facing slopes at low elevations between 136 and 517 m. It is dominated by *Quercus agrifolia* in the tree layer, *Ceanothus spinosus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 136–517 m, mean 372 m
Aspect: variable but often northwest or northeast
Slope: range 3–43 degrees, mean 24.0 degrees
Topography (micro; macro): variable but more often concave or undulating; bottom to upper slopes
Litter Cover: range 65–85%, mean 76.4%
Small Rock Cover: range 0–15%, mean 5.1%
Large Rock Cover: range 0–5%, mean 1.9%
Bare Ground: range 0–25%, mean 9.4%
Parent Material: more often sedimentary, occasionally igneous or depositional
Soil Texture: coarse loamy sand to moderately fine silty clay loam but more often medium loam

Vegetation Description:
Stands of *Quercus agrifolia/Ceanothus spinosus* Woodland/Forest form an open to continuous tree layer (12–78%, mean 24.7%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (0–55%, mean 34.2%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–35%, mean 4.3%) at 0–1 m tall. Total vegetation cover is 41–78%, mean cover is 60.3%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus spinosus. Heteromeles arbutifolia* and *Mimulus aurantiacus* are often included. The herbaceous layer is diverse and includes *Leymus condensatus, Melica imperfecta, Dryopteris arguta,* and *Marah macrocarpus.*

***Quercus agrifolia/Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	22.9	12	60	X	X	
	JUCA-T	*Juglans californica*	28	0.4	0.2	2.5			
Shrub									
	CESP	*Ceanothus spinosus*	100	22.8	7	45	X	X	
	HEAR5	*Heteromeles arbutifolia*	59	1.8	0.2	8			
	MIAU	*Mimulus aurantiacus*	52	1.5	0.2	7			
	CEME	*Ceanothus megacarpus*	45	2	0.2	25			
	MALA6	*Malosma laurina*	45	1.1	0.2	7			
	TODI	*Toxicodendron diversilobum*	34	0.6	0.2	7			
	SAME5	*Sambucus mexicana*	24	0.3	0.2	3			
	KECO	*Keckiella cordifolia*	21	0.5	1	5			
	RHOV	*Rhus ovata*	21	0.3	0.2	4			
	SASP3	*Salvia spathacea*	21	0.1	0.2	1			
Herb									
	LECO12	*Leymus condensatus*	34	0.4	0.2	3			
	MEIM	*Melica imperfecta*	24	1.5	0.2	35			
	DRAR3	*Dryopteris arguta*	24	0.1	0.2	2			
	MAMA8	*Marah macrocarpus*	21	0.1	0.2	3			

Other Noteworthy Species:
Juglans californica was found in 8 of 29 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Carduus pycnocephalus, Bromus diandrus, Bromus madritensis, Galium aparine, Bromus hordeaceus, Brassica, Brassica nigra, Centaurea melitensis, Phalaris aquatica, Foeniculum vulgare, Marrubium vulgare, Medicago polymorpha, Nicotiana glauca, Ricinus communis, Spartium junceum, Stellaria media

Samples Used in Description: (n = 29)
AA0053cc, AA0130cc, AA0228cc, AA0523, AA0596, AA0643, AA0655, AA0864, AA1041, AA1042, AA1055, AA1185, rap0128, rap0129, rap0443, rap0554m, rap0555, rap0557m, rap0677, rap1292, rap1707, rap2096, rap2189, rap2367, rap2433, rap2442, rap2490, rap2592, rap2828

Comments:
This association is largely endemic to the Santa Monica Mountains and characterized by the mixture of coast live oak over the tall mesic chaparral shrub *Ceanothus spinosus.*

Phases:
None

COMMON NAME Coast Live Oak/Greenbark Ceanothus Woodland/Forest Association

SYNONYM None

PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus agrifolia/Heteromeles arbutifolia Woodland/Forest Association

Coast Live Oak/Toyon Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6117

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes with variable or north-facing aspects at elevations between 87 and 658 m. It is dominated by *Quercus agrifolia* in the tree layer, *Heteromeles arbutifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Simi Hills Inland, Eastern Urban, Dry Inland, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 87–658 m, mean 349.9 m
Aspect: variable but often northeast or northwest
Slope: range 15–40 degrees, mean 30.5 degrees
Topography (micro; macro): variable but often undulating; bottom to top slopes
Litter Cover: range 65–85%, mean 75%
Small Rock Cover: range 0–10%, mean 4.3%
Large Rock Cover: range 0–10%, mean 2.5%
Bare Ground: range 2–20%, mean 7.8%
Parent Material: often sedimentary, occasionally igneous or depositional
Soil Texture: moderately fine sandy clay loam to moderately fine silty clay loam

Vegetation Description:
Stands of *Quercus agrifolia/Heteromeles arbutifolia* Woodland/Forest form a sparse to intermittent tree layer (2–51%, mean 26.3%) with hardwoods at 5–10 m tall, an open to intermittent shrub layer (13–45%, mean 22.3%) at 0–10 m tall, and a sparse herbaceous layer (0–10%, mean 4.1%) at 0–1 m tall. Total vegetation cover is 30–71%, mean cover is 51.9%.

In this association, the tree layer is dominated by *Quercus agrifolia*. The open to intermittent shrub layer is dominated by *Heteromeles arbutifolia*. *Malosma laurina* and *Toxicodendron diversilobum* are often included in low to moderate cover. Occasionally, *Ceanothus spinosus* and *Mimulus aurantiacus* may also be present in low cover. The herbaceous layer is diverse and includes a variety of grasses and forbs with *Leymus condensatus* most frequently occurring. *Bromus* sp*., Melica imperfecta, Bromus diandrus,* and *Stellaria media* are other herbs present in the stands at low frequency.

***Quercus agrifolia/Heteromeles arbutifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	25.5	2.5	50.0	X	X	
Shrub									
	HEAR5	*Heteromeles arbutifolia*	89	7.8	0.2	25.0		X	
	MALA6	*Malosma laurina*	61	3.1	1.0	15.0			
	TODI	*Toxicodendron diversilobum*	50	1.1	0.2	6.0			
	CESP	*Ceanothus spinosus*	39	0.6	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	39	0.5	0.2	3.0			
	ARCA11	*Artemisia californica*	28	0.2	0.2	1.0			
	RHOV	*Rhus ovata*	28	0.2	0.2	1.0			
	RHIN2	*Rhus integrifolia*	22	2.6	2.0	25.0			
	MAFA	*Malacothamnus fasciculatus*	22	1.3	0.2	12.0			
	SAME5	*Sambucus mexicana*	22	0.3	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	22	0.3	0.2	2.5			
	SALE3	*Salvia leucophylla*	22	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	50	0.5	0.2	3.0			

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2. Federal listing is Species of Concern, and state listing is Rare (CNPS 2005, SAMO 2004).

Juglans californica was found in 4 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Stellaria media, Carduus pycnocephalus, Ageratina adenophora, Avena, Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Bromus hordeaceus, Bromus madritensis, Piptatherum miliaceum, Senecio mikanioides, Avena fatua, Hedera helix, Lolium, Marrubium vulgare, Nicotiana glauca

Samples Used in Description: (n = 18)
AA0219cc, AA0392cc, AA0522, AA0735, AA0783, AA0838, AA0893, AA0919, AA1174, rap0407, rap0714, rap1694, rap1993, rap2280, rap2394, rap2446, rap2636, rap2653

Comments:
Coast live oak and toyon (*Heteromeles arbutifolia*) co-occur commonly throughout coastal, central, and southern California. This association is equivalent to others defined by Allen et al. (1991). Two phases were defined locally: one with relatively high cover of *Heteromeles* in the shrub layer and another with relatively high cover of *Malosma laurina*. Both of these phases overlap sufficiently in environmental and species characteristics to not be distinguished at the association level.

Phases:
Quercus agrifolia/Heteromeles arbutifolia (Coast Live Oak/Toyon) Phase [6117]
Quercus agrifolia/Malosma laurina (Coast Live Oak/Laurel Sumac) Phase [6116]

COMMON NAME	Coast Live Oak/Toyon Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G5S5

Global Description

Distribution:
Similar associations (e.g., similar *Q. agrifolia/Heteromeles arbutifolia-Toxicodendron diversilobum* Association) are known from much of central and southern coastal California, as far north as Napa County and as far south as Los Angeles County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association typically occurs on moderate to steep north- to northeast-facing slopes. The soils are mostly loams over hard sedimentary rocks such as sandstone and shale.

Vegetation Description:
Average cover reported by Allen et al. (1991) for the similar *Q. agrifolia/Heteromeles arbutifolia-Toxicodendron diversilobum* Association is 89% tree cover and about 10% *H. arbutifolia* and *T. diversilobum* cover. A number of woody and herbaceous species occur in < 15% constancy.

Comments:
Allen et al. (1991) have identified two associations of coast live oak with toyon: one with the shrub *Toxicodendron diversilobum* and one with grass species in the understory. It is likely that the currently defined association herein is most similar to the one with *Toxicodendron diversilobum*. Although only 50% of the samples had *T. diversilobum*, the other environmental characteristics suggest a congruence of this and these two types. Since both accounts do not completely detail the herbaceous component of stands, it remains for a more detailed study to reveal whether these two associations can be reduced to synonymy.

References:
Allen et al. 1991, Sawyer and Keeler-Wolf 1995

Quercus agrifolia/Quercus berberidifolia Woodland/Forest Association

Coast Live Oak/Scrub Oak Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6112

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with variable aspects at low elevations between 118 and 413 m. It is dominated by *Quercus agrifolia* in the tree layer, *Quercus berberidifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Lower Elevation Inland and Upper Elevation Santa Monica Mountains, Dry Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 118–413 m, mean 248 m
Aspect: variable
Slope: range 4–18 degrees, mean 14.0 degrees
Topography (micro; macro): often undulating, occasionally concave; bottom to lower slopes, sometimes to upper slopes
Litter Cover: range 35–80%, mean 61%
Small Rock Cover: range 1–30%, mean 9%
Large Rock Cover: range 0–10%, mean 2.8%
Bare Ground: range 1–35%, mean 21.7%
Parent Material: sedimentary or depositional
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Quercus agrifolia/Quercus berberidifolia* Woodland/Forest form an open to intermittent tree layer (12–38%, mean 23.1%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (9–50%, mean 28.6%) at 0–5 m tall, and a sparse to open herbaceous layer (0–18%, mean 7%) at 0–1m tall. Total vegetation cover is 45–68%, mean cover is 57%.

In this association, the tree layer is dominated by *Quercus agrifolia. Juglans californica* and *Populus fremontii* are occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Quercus berberidifolia*. Occasionally, *Rhamnus ilicifolia, Ceanothus cuneatus, Heteromeles arbutifolia, Sambucus mexicana,* and *Cercocarpus betuloides* are also included. The herbaceous layer is diverse and includes *Bromus* sp., *Centaurea melitensis,* and *Dryopteris arguta*.

***Quercus agrifolia/Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	21.5	9	35	X	X	
	JUCA-T	*Juglans californica*	25	1.1	2.5	6			
	POFR2	*Populus fremontii*	25	0.3	0.2	2.5			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	25	0.4	1	2.5			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	18	4	32	X	X	
	RHIL	*Rhamnus ilicifolia*	50	0.6	0.2	2.5			
	CECU	*Ceanothus cuneatus*	38	4.8	0.2	22			
	HEAR5	*Heteromeles arbutifolia*	38	0.9	2	3			
	SAME5	*Sambucus mexicana*	38	0.5	0.2	2			
	CEBE3	*Cercocarpus betuloides*	38	0.4	0.2	2			
	MALA6	*Malosma laurina*	25	1.3	3	7.5			
	CESP	*Ceanothus spinosus*	25	0.5	1	3			
	TODI	*Toxicodendron diversilobum*	25	0.5	1	3			
	MIAU	*Mimulus aurantiacus*	25	0.2	0.2	1			
	ERFA2	*Eriogonum fasciculatum*	25	0.1	0.2	0.2			
Herb									
	BROMU	*Bromus*	38	3.1	4	11			
	UNHE	Unknown Herbs/Forbs	38	1.4	3	5			
	BRDI3	*Bromus diandrus*	38	0.5	0.2	2.5			X
	CEME2	*Centaurea melitensis*	25	0.8	3	3			X
	STME2	*Stellaria media*	25	0.2	0.2	1			X
	DRAR3	*Dryopteris arguta*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 2 of 8 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Polygala cornuta was found in 1 of 8 surveys of this plant community, which could be the rare subspecies *P. C.* var. *fishiae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-2. Global rank is G5T4, and state rank is S3.3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Stellaria media, Galium aparine, Carduus pycnocephalus, Lolium, Marrubium vulgare, Melilotus albus, Piptatherum miliaceum, Vinca major

Samples Used in Description: (n = 8)
AA0470cc, AA0754cc, AA0808, AA1136, rap0459, rap1551m, rap2253, rap2830

Comments:
This association typically occurs in between a lower slope or bottom slope position while *Quercus agrifolia* Woodland, *Q. agrifolia/Heteromeles arbutifolia*, or other *Q. agrifolia* associations occur and a middle or lower slope position with *Quercus berberidifolia A*lliance stands. These oaks

stands are not usually adjacent or transitional throughout the Santa Monica Mountains, and they occur in large enough stands so as not to be considered strictly ecotonal.

Phases:
None

COMMON NAME	Coast Live Oak/Scrub Oak Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A somewhat similar association, the *Quercus agrifolia-Umbellularia californica/Heteromeles arbutifolia-Quercus berberidifolia* Association, has been defined. It differs from this association by having *Umbellularia* in > 75% of the samples, and *Arbutus menziesii* in about half of the samples. It is perhaps a northern California analog to this association.

References:
Allen et al. 1991

Quercus agrifolia/Salvia leucophylla-Artemisia californica Woodland/Forest Association

Coast Live Oak/Purple Sage-California Sagebrush Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1116

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes that are often north facing at elevations between 53 and 420 m. It is dominated by *Quercus agrifolia* in the tree layer, *Salvia leucophylla* and *Artemisia californica* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 53–420 m, mean 301.1 m
Aspect: variable but often northwest or northeast
Slope: range 15–35 degrees, mean 26.0 degrees
Topography (micro; macro): often convex or undulating, occasionally flat; bottom to top slopes
Litter Cover: range 20–75%, mean 49.4%
Small Rock Cover: range 2–20%, mean 10.3%
Large Rock Cover: range 0–2%, mean 1.1%
Bare Ground: range 15–50%, mean 28.8%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: moderately fine clay loam to fine sandy clay

Vegetation Description:
Stands of *Quercus agrifolia/Salvia leucophylla-Artemisia californica* Woodland/Forest form a sparse to intermittent tree layer (8–35%, mean 19.3%) with hardwoods at 2–15 m tall, an open to intermittent shrub layer (10–50%, mean 27.5%) at 0–5 m tall, and a sparse to open herbaceous layer (0–22%, mean 5.6%) at 0–1 m tall. Total vegetation cover is 32–64%, mean cover is 49.9%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Juglans californica* is occasionally included in this layer. The open to intermittent shrub layer is dominated by *Salvia leucophylla* and *Artemisia californica.* Occasionally, *Malosma laurina* and *Malacothamnus fasciculatus* are also included. The herbaceous layer is diverse and includes *Leymus condensatus, Brassica nigra, Bromus diandrus,* and *Centaurea melitensis.*

***Quercus agrifolia/Salvia leucophylla-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	96	16.1	5	33	X	X	
	JUCA-T	*Juglans californica*	29	1.9	1	15			
	QULO-T	*Quercus lobata*	29	0.7	1	4			
Shrub									
	SALE3	*Salvia leucophylla*	100	13.3	2	25	X	X	
	ARCA11	*Artemisia californica*	96	10	0.2	23	X	X	
	MALA6	*Malosma laurina*	46	1.2	0.2	9			
	SAME5	*Sambucus mexicana*	43	0.4	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	36	1	0.2	17			
	HASQ2	*Hazardia squarrosa*	32	0.2	0.2	3			
	HEAR5	*Heteromeles arbutifolia*	29	0.5	0.2	5			
	MIAU	*Mimulus aurantiacus*	21	0.8	0.2	12			
	RHOV	*Rhus ovata*	21	0.5	0.2	6			
	TODI	*Toxicodendron diversilobum*	21	0.3	0.2	7.5			
	BAPI	*Baccharis pilularis*	21	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	54	1.4	0.2	10			
	BRNI	*Brassica nigra*	36	0.5	0.2	8			X
	BRDI3	*Bromus diandrus*	29	0.9	0.2	6			X
	CEME2	*Centaurea melitensis*	29	0.4	0.2	3			X

Other Noteworthy Species:
Juglans californica was found in 9 of 28 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Carduus pycnocephalus, Marrubium vulgare, Avena, Melilotus indicus, Lolium, Silybum marianum, Bromus hordeaceus, Anagallis arvensis, Avena barbata, Avena fatua, Erodium cicutarium, Galium aparine, Lactuca serriola, Medicago polymorpha, Senecio vulgaris, Vicia villosa

Samples Used in Description: (n = 28)
AA0318cc, AA0385cc, AA0462cc, AA0496cc, AA0578, AA0684, AA0687, AA0709, AA0951, AA0953, AA0981, AA1096, AA1180, rap0200, rap1309, rap1325, rap1401, rap1847m, rap2001, rap2067, rap2184, rap2185, rap2199, rap2201, rap2277, rap2554rlv, rap2630, rap2853rlv

Comments:
This is a locally common association that is largely endemic to the Santa Monica Mountains and Ventura region of the southern California coast. It represents the most common expression of coast live oak and coastal sage scrub species. These stands appear to be mature stands with lengthening intervals between fires, which have allowed for oaks and coastal scrub to recolonize areas and develop into mature trees and shrubs that may have been dominated more by grasses under a regime of higher frequency fire. Alternatively, this type may be a type recovering from grazing pressure more than a release from fires (J. Christian, personal observation).

Phases:
None

COMMON NAME	Coast Live Oak/Purple Sage-California Sagebrush Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar association has been reported by Allen et al. (1991). It is the *Quercus agrifolia/ Artemisia californica/*Grass Association. It is likely to be the "parent" suballiance to this association. It is identified from Santa Clara to San Diego counties with *Artemisia californica* as the overall constant shrub at 88% and *Salvia leucophylla* at 13% constancy. However, since *A. californica* has a much wider geographic range than S*. leucophylla*, it is likely that if the southern California samples were analyzed separately, they would also have shown a higher constancy of S. *leucophylla*, thus mirroring the Santa Monica Mountains situation.

References:
Allen et al. 1991

Quercus agrifolia/Toxicodendron diversilobum Woodland/Forest Association

Coast Live Oak/Poison Oak Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1117

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at low elevations between 40 and 577 m. It is dominated by *Quercus agrifolia* in the tree layer. *Toxicodendron diversilobum* is characteristic in the understory shrub layer, and a variety of grasses and forbs is in the herbaceous layer.

Distribution:
This association is sampled in the Western Fog Zone, Upper Elevation Santa Monica Mountains, Immediate Coast, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Dry Inland of the study area.

Environmental Description:
Elevation: range 40–577 m, mean 286.4 m
Aspect: variable, often northwest or northeast
Slope: range 1–40 degrees, mean 20.7 degrees
Topography (micro; macro): variable; bottom to top slopes
Litter Cover: range 45–85%, mean 72.2%
Small Rock Cover: range 0–15%, mean 4.2%
Large Rock Cover: range 0–20%, mean 3%
Bare Ground: range 2–25%, mean 12%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: medium to very fine loamy sand to moderately fine sandy clay loam but often medium loam

Vegetation Description:
Stands of *Quercus agrifolia/Toxicodendron diversilobum* Woodland/Forest form a sparse to continuous tree layer (5–74%, mean 31.8%) with conifers at 0–20 m tall and hardwoods at 2–35 m tall, a sparse to intermittent shrub layer (6–56%, mean 24.8%) at 0–10 m tall, and a sparse to open herbaceous layer (0–15%, mean 5.3%) at 0–2 m tall. Total vegetation cover is 38–90%, mean cover is 58.6%.

In this association, the tree layer is dominated by *Quercus agrifolia*. The shrub layer is sparse to intermittent and is characterized by *Toxicodendron diversilobum*. Frequently, *Mimulus aurantiacus* and *Heteromeles arbutifolia* are also included. *Malosma laurina, Artemisia californica, Salvia leucophylla, Sambucus mexicana,* and *Rhamnus ilicifolia* are occasionally included in the shrub layer. The herbaceous layer is diverse and includes *Leymus condensatus, Marah macrocarpus, Bromus diandrus, Piptatherum miliaceum,* and *Melica imperfecta.*

***Quercus agrifolia/Toxicodendron diversilobum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	29.0	5.0	65.0	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	34	1.7	1.0	15.0			
Shrub									
	TODI	*Toxicodendron diversilobum*	86	7.3	0.2	51.0		X	
	MIAU	*Mimulus aurantiacus*	71	4.7	0.2	25.0			
	HEAR5	*Heteromeles arbutifolia*	54	1.0	0.2	5.0			
	MALA6	*Malosma laurina*	49	1.4	0.2	9.0			
	ARCA11	*Artemisia californica*	46	1.8	0.2	16.0			
	SALE3	*Salvia leucophylla*	37	1.1	0.2	15.0			
	SAME5	*Sambucus mexicana*	34	0.5	0.2	2.5			
	RHIL	*Rhamnus ilicifolia*	34	0.3	0.2	2.5			
	KECO	*Keckiella cordifolia*	29	0.6	0.2	5.0			
	MAFA	*Malacothamnus fasciculatus*	26	0.4	0.2	3.0			
	CESP	*Ceanothus spinosus*	23	1.0	0.2	12.0			
	BAPI	*Baccharis pilularis*	20	0.7	0.2	10.0			
Herb									
	LECO12	*Leymus condensatus*	57	1.4	0.2	15.0			
	MAMA8	*Marah macrocarpus*	26	0.2	0.2	2.5			
	BRDI3	*Bromus diandrus*	23	0.3	0.2	4.0			X
	PIMI3	*Piptatherum miliaceum*	23	0.3	0.2	3.0			X
	MEIM	*Melica imperfecta*	20	0.4	0.2	7.0			

Other Noteworthy Species:
Juglans californica was found in 8 of 35 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 35 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Woodwardia fimbriata was found in 1 of 35 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Piptatherum miliaceum, Marrubium vulgare, Brassica nigra, Carduus pycnocephalus, Bromus madritensis, Phalaris aquatica, Centaurea melitensis, Galium aparine, Avena, Anagallis arvensis, Cirsium vulgare, Stellaria media, Bromus hordeaceus, Lolium, Hirschfeldia incana, Conium maculatum, Ageratina adenophora, Avena barbata, Brassica, Chenopodium album, Foeniculum vulgare, Hypochaeris, Medicago polymorpha, Melilotus indicus, Nicotiana glauca, Picris echioides, Senecio vulgaris, Sonchus, Sonchus oleraceus

Samples Used in Description: (n = 35)
AA0018cc, AA0019cc, AA0046cc, AA0330cc, AA0914, AA0977, AA0978, AA1087, AA1125, AA1224, rap0002m, rap0082, rap0084, rap0198, rap0201m, rap0212, rap0215m, rap0245, rap0730, rap0756, rap0838, rap0853, rap1152, rap1374, rap1528, rap1708, rap1983, rap2076m, rap2183, rap2299, rap2304, rap2461rlv, rap2555rlv, rap2557rlv, rap2735

Comments:
This is a common association in the Santa Monica Mountains. It can be distinguished from others of this alliance by the relatively high cover of understory shrubs (about 25%) most of which are *Toxicodendron diversilobum* and *Mimulus aurantiacus.* Two phases have been distinguished: one with high cover of *T. diversilobum* and the other with high cover of *M. aurantiacus.* Both have sufficient overlap in species and environmental characteristics to be combined.

Phases:
Quercus agrifolia/Toxicodendron diversilobum (Coast Live Oak/Poison Oak) Phase [1117]
Quercus agrifolia/Mimulus aurantiacus (Coast Live Oak/Bush Monkey Flower) Phase [6113]

COMMON NAME	Coast Live Oak/Poison Oak Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	

Global Description

Distribution:
This association is known from other parts of central and south coastal California (Allen et al. 1991).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Several other *Quercus agrifolia* associations are characterized by the presence of *T. diversilobum*. These include *Q. agrifolia/T. diversilobum*/Grass (Allen et al. 1991), *Q. agrifolia/T. diversilobum-Riparian,* and *Q. agrifolia/T. diversilobum*/Grass (Evens and San 2005), and *Q. agrifolia/T. diversilobum-(Corylus cornuta)* (NatureServe et al. 2003a). All these have distinguishing biogeographic and environmental features that justify keeping these as separate associations.

References:
Allen et al. 1991, NatureServe et al. 2003a, Evens and San 2005

Quercus agrifolia-Juglans californica Woodland/Forest Association

Coast Live Oak-California Walnut Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1115

Local Description

Summary:
This woodland/forest association occurs on moderately steep to very steep slopes with variable aspects at low to mid elevations between 58 and 869 m. It is dominated by *Quercus agrifolia* and *Juglans californica* in the tree layer. *Toxicodendron diversilobum* is characteristic in the understory shrub layer. A variety of grasses and forbs occurs in the herbaceous layer with *Leymus condensatus* most frequently occurring.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Dry Inland, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 58–869 m, mean 275 m
Aspect: often northeast or northwest, sometimes southwest or variable
Slope: range 7–46 degrees, mean 25.4 degrees
Topography (micro; macro): variable but more often undulating or concave; bottom to upper slopes
Litter Cover: range 35–90%, mean 67%
Small Rock Cover: range 0–50%, mean 8.4%
Large Rock Cover: range 0–3%, mean 0.8%
Bare Ground: range 2–35%, mean 11%
Parent Material: variable but more often sedimentary, occasionally igneous or depositional
Soil Texture: medium loam to moderately fine sandy clay loam but more often moderately fine clay loam

Vegetation Description:
Stands of *Quercus agrifolia-Juglans californica* Woodland/Forest form an open to continuous tree layer (0–72%, mean 36.5%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (2–63%, mean 16.6%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–46%, mean 7.3%) at 0–1 m tall. Total vegetation cover is 44–85%, mean cover is 58.3%.

In this association, the tree layer is dominated by *Quercus agrifolia* and *Juglans californica*. *Umbellularia californica* is infrequently included in this layer at low cover. The shrub layer is sparse to intermittent and is characterized by *Toxicodendron diversilobum*, usually with highest cover. *Heteromeles arbutifolia* and other shrubs, such as *Sambucus mexicana, Artemisia californica,* and *Mimulus aurantiacus,* are often found in lower cover. The herbaceous layer is diverse with *Leymus condensatus* often present and various herbs occasionally present such as *Marrubium vulgare, Bromus* sp., *Piptatherum miliaceum,* and *Brassica nigra*.

***Quercus agrifolia-Juglans californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	22.8	4.0	65.0	X	X	
	JUCA-T	*Juglans californica*	96	13.4	2.5	42.0	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	22	0.4	0.2	3.0			
Shrub									
	TODI	*Toxicodendron diversilobum*	87	6.1	0.2	20.0		X	
	HEAR5	*Heteromeles arbutifolia*	70	2.2	0.2	10.0			
	SAME5	*Sambucus mexicana*	48	1.1	0.2	7.0			
	ARCA11	*Artemisia californica*	48	0.9	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	43	0.7	0.2	4.0			
	MALA6	*Malosma laurina*	35	0.5	0.2	3.0			
	BAPI	*Baccharis pilularis*	26	0.4	0.2	2.5			
	RISP	*Ribes speciosum*	26	0.1	0.2	1.0			
	RHIN2	*Rhus integrifolia*	22	0.5	0.2	4.0			
	LONIC	*Lonicera*	22	0.3	0.2	4.0			
Herb									
	LECO12	*Leymus condensatus*	52	0.9	0.2	4.0			
	MAVU	*Marrubium vulgare*	35	0.2	0.2	2.5			X
	BRDI3	*Bromus diandrus*	30	1.2	1.0	12.0			X
	BROMU	*Bromus*	22	0.9	1.0	7.5			
	PIMI3	*Piptatherum miliaceum*	22	0.4	0.2	6.0			X
	BRNI	*Brassica nigra*	22	0.2	0.2	2.0			X

Other Noteworthy Species:
Juglans californica was found in 23 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Marrubium vulgare, Bromus diandrus, Piptatherum miliaceum, Brassica nigra, Carduus pycnocephalus, Ageratina adenophora, Medicago polymorpha, Silybum marianum, Centaurea melitensis, Brassica, Euphorbia terracina, Hirschfeldia incana, Bromus hordeaceus, Melilotus indicus, Stellaria media, Cirsium vulgare, Nicotiana glauca, Ricinus communis, Rumex crispus, Galium aparine, Avena, Bromus madritensis, Anagallis arvensis, Avena barbata, Erodium, Lactuca serriola, Plantago lanceolata, Sonchus asper, Sonchus oleraceus

Samples Used in Description: (n = 23)
AA0153cc, AA0199cc, AA0242cc, AA0306cc, AA0415, AA0502, AA0738, rap0483, rap0620m, rap0732, rap0736, rap0748, rap0755, rap0763, rap1139, rap1177, rap2255, rap2414, rap2460rlv, rap2464rlv, rap2510, rap2565, rap2926

Comments:
This association is largely endemic to the Santa Monica Mountains and immediate surroundings. It is differentiated from others of this alliance by the constant presence of *Juglans californica* as a sub- or occasionally codominant. Also as a general note, cover values of *Juglans* are likely to

average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Two phases have been identified: one with little understory shrubs or herbs and another with high cover of *Toxicodendron diversilobum*.

Phases:
Quercus agrifolia-Juglans californica (Coast Live Oak-California Walnut) Phase [1115]
Juglans californica-Quercus agrifolia/Toxicodendron diversilobum (California Walnut-Coast Live Oak/Poison Oak) Phase [6311]

COMMON NAME	Coast Live Oak-California Walnut Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus agrifolia-Salix lasiolepis Woodland/Forest Association

Coast Live Oak-Arroyo Willow Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6114

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with variable aspects at low elevations between 119 and 527 m. It is dominated by *Quercus agrifolia* in the tree layer and *Salix lasiolepis* in the understory tree layer. A variety of grasses and forbs is often abundant in the herbaceous layer.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 119–527 m, mean 345 m
Aspect: variable
Slope: range 2–15 degrees, mean 10.7 degrees
Topography (micro; macro): variable but more often concave; bottom to mid slopes
Litter Cover: range 0–80%, mean 40%
Small Rock Cover: range 0–8%, mean 4.3%
Large Rock Cover: range 0–2%, mean 0.7%
Bare Ground: range 15–70%, mean 33.3%
Parent Material: often sedimentary, occasionally igneous
Soil Texture: coarse loamy sand

Vegetation Description:
Stands of *Quercus agrifolia-Salix lasiolepis* Woodland/Forest form an open to intermittent tree layer (27–63%, mean 46.8%) with conifers at 0–15 m tall and hardwoods at 5–15 m tall, a sparse to open shrub layer (1–16%, mean 6.7%) at 0–5 m tall, and a sparse herbaceous layer (0–7%, mean 3.3%) at 0–1 m tall. Total vegetation cover is 43–65%, mean cover is 56.2%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Salix lasiolepis* is frequently in the understory or overstory tree layer, while *Salix laevigata* may also occur in the overstory tree layer. The shrub layer is sparse to open and frequently includes *Heteromeles arbutifolia* and *Toxicodendron diversilobum*. The herbaceous layer is diverse and includes *Piptatherum miliaceum, Artemisia douglasiana,* and *Rorippa nasturtium-aquaticum*.

***Quercus agrifolia-Salix lasiolepis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	28.5	19	40	X	X	
	SALIX-T	*Salix*	50	4.7	5	15			
	SALA3-T	*Salix laevigata*	33	2.3	4	10			
	JUCA-T	*Juglans californica*	33	0.5	0.2	3			
	PLRA	*Platanus racemosa*	33	0.2	0.2	1			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	50	9.3	6	30	X		
	QUAG-L	*Quercus agrifolia*	33	0.5	1	2			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	67	0.9	0.2	4			
	TODI	*Toxicodendron diversilobum*	50	0.4	0.2	2			
	RHIL	*Rhamnus ilicifolia*	33	0.5	0.2	3			
	BASA4	*Baccharis salicifolia*	33	0.2	0.2	1			
	KECO	*Keckiella cordifolia*	33	0.2	0.2	1			
Herb									
	PIMI3	*Piptatherum miliaceum*	50	1	0.2	5			X
	ARDO3	*Artemisia douglasiana*	50	0.5	0.2	2			
	UNHE	Unknown Herbs/Forbs	33	0.8	2	3			
	RONA2	*Rorippa nasturtium-aquaticum*	33	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 2 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Rorippa nasturtium-aquaticum, Schinus molle, Nerium oleander, Bromus diandrus, Cortaderia, Ricinus communis, Rumex crispus, Sonchus, Vinca major

Samples Used in Description: (n = 6)
AA0530, AA0695, AA1020, rap1580, rap2389, rap2766

Comments:
This is a riparian oak woodland. Several associated species are indicative of higher than ambient moisture settings as a result of urban runoff. Most of the *Salix* sp. unidentified in the overstory tree layer of this association are likely to be S*. lasiolepis*.

Phases:
None

COMMON NAME	Coast Live Oak-Arroyo Willow Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland

PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	2
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur elsewhere in central and southern coastal California.

References:
None

Quercus agrifolia-Umbellularia californica Woodland/Forest Association

Coast Live Oak-California Bay Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1114

Local Description

Summary:
This woodland/forest association occurs on gentle to steep, often north-facing slopes at low to mid elevations between 0 and 851 m. It is dominated by *Quercus agrifolia* and *Umbellularia californica* in the tree layer, *Heteromeles arbutifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 0–851 m, mean 399 m
Aspect: variable but often northeast or northwest
Slope: range 2–36 degrees, mean 24.8 degrees
Topography (micro; macro): variable but more often concave or undulating; bottom to top slopes
Litter Cover: range 80–80%, mean 80%
Small Rock Cover: range 1–9%, mean 4.4%
Large Rock Cover: range 0–25%, mean 7.2%
Bare Ground: range 1–15%, mean 6.8%
Parent Material: often sedimentary, occasionally igneous, metamorphic, or depositional
Soil Texture: more often medium loam, less often moderately fine silty clay loam

Vegetation Description:
Stands of *Quercus agrifolia-Umbellularia californica* Woodland/Forest form an open to continuous tree layer (7–70%, mean 40.3%) with hardwoods at 2–20 m tall, a sparse to intermittent shrub layer (0–50%, mean 15.7%) at 0–5 m tall, and a sparse to open herbaceous layer (0–15%, mean 1.7%) at 0–2 m tall. Total vegetation cover is 40–78%, mean cover is 57%.

In this association, the tree layer is dominated by *Quercus agrifolia* and *Umbellularia californica*. *Platanus racemosa* and *Juglans californica* are occasionally included in this layer. The shrub layer is sparse to intermittent and is characterized by *Heteromeles arbutifolia* at low cover. Frequently, *Toxicodendron diversilobum* and *Mimulus aurantiacus* are also included. The herbaceous layer is diverse and occasionally includes *Leymus condensatus, Rubus ursinus, Marah macrocarpus,* and *Dryopteris arguta.*

***Quercus agrifolia-Umbellularia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	22.4	1.0	50.0	X	X	
	UMCA-T	*Umbellularia californica*	89	14.7	1.0	45.0	X	X	
	PLRA	*Platanus racemosa*	44	1.4	0.2	10.0			
	JUCA-T	*Juglans californica*	28	0.8	1.0	6.0			
Tree Understory									
	UMCA-M	*Umbellularia californica*	22	1.0	2.0	8.0			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	78	1.4	0.2	7.0		X	
	TODI	*Toxicodendron diversilobum*	67	4.6	1.0	20.0			
	MIAU	*Mimulus aurantiacus*	50	1.2	0.2	6.0			
	CESP	*Ceanothus spinosus*	44	2.2	0.2	17.0			
	CEOL	*Ceanothus oliganthus*	28	0.7	0.2	5.0			
	PRIL	*Prunus ilicifolia*	28	0.3	0.2	2.5			
	RHOV	*Rhus ovata*	22	0.4	1.0	4.0			
	MALA6	*Malosma laurina*	22	0.4	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	39	0.7	0.2	4.0			
	RUUR	*Rubus ursinus*	22	0.4	0.2	6.0			
	MAMA8	*Marah macrocarpus*	22	0.2	0.2	2.5			
	DRAR3	*Dryopteris arguta*	22	0.1	0.2	1.0			

Other Noteworthy Species:
Juglans californica was found in 5 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 18 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Piptatherum miliaceum, Bromus hordeaceus, Senecio mikanioides, Spartium junceum

Samples Used in Description: (n = 18)
AA0143cc, AA0221cc, AA0260cc, AA0654, AA0786, AA0965, rap0410, rap0435, rap0460, rap0498, rap0585, rap0782, rap1514m, rap1591, rap1775, rap2285, rap2352, rap2383

Comments:
This is the common oak and bay forest of the Santa Monica Mountains. It is widespread on mesic slopes and in canyons at lower to mid elevations. Coast live oak is usually clearly dominant, but California bay accounts for approximately half the total tree cover. Two phases have been identified, one with significantly higher *Toxicodendron* cover than the other.

Phases:
Quercus agrifolia-Umbellularia californica (Coast Live Oak-California Bay) Phase [1114]
Quercus agrifolia-Umbellularia californica/Toxicodendron diversilobum (Coast Live Oak-California Bay/Poison Oak) Phase [6119]

COMMON NAME	Coast Live Oak-California Bay Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Several other *Q. agrifolia* associations have been identified with a subdominance of *Umbellularia californica*. These include *Q. agrifolia-U. californica/Arctostaphylos glauca-Toxicodendron diversilobum* and *Q. agrifolia-U. californica/*Grass (Evens and San 2005), *Q. agrifolia-U. californica/Ceanothus oliganthus* (this report), and *Q. agrifolia-U. californica/ Heteromeles*

arbutifolia-Quercus berberidifolia (Allen et al. 1991). All these differ in their biogeography and in their environmental factors but are clearly related. All are characteristic of the central and southern coastal portions of California.

References:
Allen et al. 1991, Evens and San 2005

Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus Woodland/Forest Association

Coast Live Oak-California Bay/Hairy Leaf Ceanothus Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1119

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes, often with north-facing aspects at low to mid elevations between 298 and 801 m. *Quercus agrifolia* and *Umbellularia californica* are dominant in the tree layer, *Ceanothus oliganthus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 298–801 m, mean 588.3 m
Aspect: variable but often northeast
Slope: range 4–35 degrees, mean 23.2 degrees
Topography (micro; macro): variable; bottom to top slopes
Litter Cover: range 15–80%, mean 47.5%
Small Rock Cover: range 3–25%, mean 10.6%
Large Rock Cover: range 0–25%, mean 8.4%
Bare Ground: range 5–15%, mean 10.8%
Parent Material: igneous, depositional, or sedimentary
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus* Woodland/Forest form an open to intermittent tree layer (18–38%, mean 32.4%) with hardwoods at 5–10 m tall, a sparse to intermittent shrub layer (6–45%, mean 26.1%) at 0–10 m tall, and a sparse to open herbaceous layer (0–25%, mean 2.9%) at 0–1 m tall. Total vegetation cover is 40–90%, mean cover is 59.6%.

In this association, the tree layer is dominated by *Quercus agrifolia* and *Umbellularia californica*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus oliganthus. Heteromeles arbutifolia* is often included. *Quercus berberidifolia, Mimulus aurantiacus, Adenostoma sparsifolium,* and *Ribes malvaceum* are occasionally present in low cover. The herbaceous layer is simple and occasionally includes *Dryopteris arguta, Piptatherum miliaceum, Leymus condensatus, Melica imperfecta,* and *Silene gallica* in low cover.

***Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	23	12	35	X	X	
	UMCA-T	*Umbellularia californica*	56	6	3	23			
	JUCA-T	*Juglans californica*	33	0.8	2	3			
Tree Understory									
	UMCA-M	*Umbellularia californica*	44	2.3	0.2	10			
	JUCA-M	*Juglans californica*	22	0.3	1	2			
Shrub									
	CEOL	*Ceanothus oliganthus*	89	16.1	6	40	X	X	
	HEAR5	*Heteromeles arbutifolia*	67	2.3	0.2	10			
	QUBE5	*Quercus berberidifolia*	44	0.8	0.2	5			
	MIAU	*Mimulus aurantiacus*	44	0.4	0.2	2.5			
	ADSP	*Adenostoma sparsifolium*	44	0.3	0.2	1			
	RIMA	*Ribes malvaceum*	44	0.1	0.2	0.2			
	PRIL	*Prunus ilicifolia*	33	1.2	0.2	8			
	RHOV	*Rhus ovata*	33	0.5	0.2	4			
	TODI	*Toxicodendron diversilobum*	33	0.4	0.2	2.5			
	ARGL3	*Arctostaphylos glandulosa*	33	0.2	0.2	1			
	CESP	*Ceanothus spinosus*	22	0.8	2.5	5			
	MAFA	*Malacothamnus fasciculatus*	22	0.4	1	3			
	MALA6	*Malosma laurina*	22	0.3	1	2			
	DERI	*Dendromecon rigida*	22	0.1	0.2	1			
	ADFA	*Adenostoma fasciculatum*	22	0.01	0.2	0.2			
	GAVE2	*Garrya veatchii*	22	0.01	0.2	0.2			
	LEFR	*Lepechinia fragrans*	22	0.01	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	22	0.01	0.2	0.2			
Herb									
	DRAR3	*Dryopteris arguta*	22	0.9	0.2	7.5			
	PIMI3	*Piptatherum miliaceum*	22	0.1	0.2	1			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 9 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 5 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 2 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Silene gallica

Samples Used in Description: (n = 9)
AA0473cc, AA1226, rap0282m, rap0284, rap0696m, rap0777m, rap0784, rap2425, rap2836

Comments:
This association is characteristic of the more inland or upper elevation mixed oak and bay woodlands of the project area. In general, *Ceanothus oliganthus* does not occur much below 615 m in the main portion of the Santa Monica Mountains, thus the combination of these species is often found on shaded upper slopes and in upper canyons. In the less coastal Simi Hills, this association may occur at lower elevations.

Phases:
None

COMMON NAME	Coast Live Oak-California Bay/Hairy Leaf Ceanothus Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	2
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Several other *Q. agrifolia* associations have been identified with a subdominance of *Umbellularia californica*. These include *Q. agrifolia-U. californica/Arctostaphylos glauca-Toxicodendron diversilobum* and *Q. agrifolia-U. californica*/Grass (Evens and San 2005), *Q. agrifolia-U. californica* (this report), and *Q. agrifolia-U. californica/Heteromeles arbutifolia-Q. berberidifolia* (Allen et al. 1991). All these differ in their biogeography and in their environmental factors but are clearly related. All are characteristic of the central and southern coastal portions of California.

References:
Allen et al. 1991, Evens and San 2004

Quercus lobata/Annual Grass-Herb Woodland/Forest Association

Valley Oak/Annual Grass-Herb Woodland/Forest Association
***Quercus lobata* Woodland/Forest Alliance**
Valley Oak Woodland/Forest Alliance

Mapping Code: 1321

Local Description

Summary:
This woodland/forest association occurs on flat to steep slopes with variable aspect at low elevations between 230 and 418 m. It is dominated by *Quercus lobata* in the tree layer, and various herbs and grasses, such as *Brassica nigra*, *Bromus diandrus,* and *Lactuca serriola,* in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 230–418 m, mean 297 m
Aspect: variable
Slope: range 0–35 degrees, mean 12.8 degrees
Topography (micro; macro): variable but more often concave; bottom to top slopes
Litter Cover: range 25–85%, mean 55.8%
Small Rock Cover: range 0–25%, mean 7.8%
Large Rock Cover: range 0–5%, mean 1.1%
Bare Ground: range 0–63%, mean 21.1%
Parent Material: often depositional, occasionally sedimentary or igneous
Soil Texture: medium loam to fine clay

Vegetation Description:
Stands of *Quercus lobata*/Annual Grass-Herb Woodland/Forest form a sparse to intermittent tree layer (4–41%, mean 15.8%) with hardwoods at 2–15 m tall, a sparse shrub layer (0–5%, mean 1%) at 0–5 m tall, and an open to intermittent herbaceous layer (16–53%, mean 28.3%) at 0–2 m tall. Total vegetation cover is 20–60%, mean cover is 42.3%.

In this association, the tree layer is dominated by *Quercus lobata*. *Quercus agrifolia* is occasionally included in this layer. The shrub layer is sparse and infrequently includes species such as *Baccharis salicifolia* and *Salvia leucophylla*. The herbaceous layer is dominated by nonnative species, characteristically including *Brassica nigra* and *Bromus diandrus.* Other herbs often include *Lactuca serriola*, *Bromus* sp., *Erodium* sp., and other grasses and forbs.

***Quercus lobata*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QULO-T	*Quercus lobata*	83	12.4	4	35	X	X	
	QUAG-T	*Quercus agrifolia*	33	0.2	0.2	1			
	JUCA-T	*Juglans californica*	25	1.2	1	12			
Tree Understory									
	QULO-M	*Quercus lobata*	25	1.1	4	5			
Herb									
	BRNI	*Brassica nigra*	83	8	4	15		X	X
	BRDI3	*Bromus diandrus*	75	6.1	0.2	15		X	X
	LASE	*Lactuca serriola*	67	1	0.2	4			X
	AVFA	*Avena fatua*	33	3.4	0.2	30			X
	MAPA5	*Malva parviflora*	33	0.4	0.2	3			X
	CEME2	*Centaurea melitensis*	25	0.4	0.2	5			X
	HORDE	*Hordeum*	25	0.3	0.2	3			
	BRHO2	*Bromus hordeaceus*	25	0.2	0.2	1			X
	HIIN3	*Hirschfeldia incana*	25	0.2	0.2	1			X
	LECO12	*Leymus condensatus*	25	0.1	0.2	1			
	MEIN2	*Melilotus indicus*	25	0.1	0.2	1			X

Other Noteworthy Species:
Dudleya cymosa was found in 1 of 12 surveys of this plant community, which could be one of the rare subspecies such as *D. C.* subsp. *ovatifolia, D. C.* subsp. *marcescens,* or *D. C.* subsp. *agourensis.* Regionally, the park considers these three species as Rare. CNPS ranks them as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G5T2 or G5T1, and state rank is S2.2 or S1.2. Federal listing is Threatened, and state listing is none or Rare (CNPS 2005, SAMO 2004).

Juglans californica was found in 3 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Lactuca serriola, Avena fatua, Malva parviflora, Centaurea melitensis, Bromus hordeaceus, Hirschfeldia incana, Melilotus indicus, Avena, Erodium moschatum, Erodium cicutarium, Piptatherum miliaceum, Centaurea solstitialis, Medicago polymorpha, Erodium, Bromus madritensis, Arundo donax, Carduus pycnocephalus, Conyza canadensis, Foeniculum vulgare, Lolium, Nicotiana glauca, Rumex crispus

Samples Used in Description: (n = 12)
AA0355, AA0541, AA0685, AA1133, rap1240, rap1496, rap1497, rap1498, rap2245, rap2314, rap2379, rap2631

Comments:
Two associations of this alliance occur in the study area. Both represent the southernmost representation of this alliance. Interestingly, both associations also are represented throughout much of the full range of this alliance, occurring far north into northern California. The association name has been modified somewhat from Allen et al. (1991), where it was called *Q. lobata*/Grass. The renaming here suggests that it also includes annual forbs as well as grasses.

Phases:
None

COMMON NAME	Valley Oak/Annual Grass-Herb Woodland/Forest Association
SYNONYM	Valley Oak/Grass (Allen et al. 1991)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Quercus lobata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from northern, central, and southern coastal California from Mendocino to Los Angeles counties inland to Contra Costa, Santa Clara, San Benito, and Kern counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The association occurs on mostly loamy soils of granitic or sedimentary parent material. It occurs on all aspects with slope usually < 35% with elevation below 1,710 m.

Vegetation Description:
Valley oak is the dominant tree in the overstory in open to moderately open woodlands. Shrub species are rarely present, and grasses are in high abundance.

Comments:
See local description.

References:
Allen et al. 1991, Sawyer and Keeler-Wolf 1995

Quercus lobata-Quercus agrifolia/Annual Grass-Herb Woodland/Forest Association

Valley Oak-Coast Live Oak/Annual Grass Herb Woodland/Forest Association
***Quercus lobata* Woodland/Forest Alliance**
Valley Oak Woodland/Forest Alliance

Mapping Code: 1323

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at low elevations between 236 and 465 m. It is dominated by *Quercus agrifolia* and *Quercus lobata* in the tree layer and *Brassica nigra* in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 236–465 m, mean 337 m
Aspect: variable
Slope: range 2–35 degrees, mean 17.7 degrees
Topography (micro; macro): variable but more often concave; bottom to top slopes
Litter Cover: range 20–85%, mean 58.6%
Small Rock Cover: range 1–30%, mean 7.2%
Large Rock Cover: range 0–8%, mean 1.5%
Bare Ground: range 2–50%, mean 17.8%
Parent Material: often sedimentary, occasionally depositional
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Quercus lobata-Quercus agrifolia/*Annual Grass-Herb Woodland/Forest form a sparse to continuous tree layer (0–67%, mean 22.7%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (0–47%, mean 6.7%) at 0–5 m tall, and a sparse to intermittent herbaceous layer (1–60%, mean 26.3%) at 0–1 m tall. Total vegetation cover is 27–70%, mean cover is 51.5%.

In this association, the tree layer is codominated by *Quercus agrifolia* and *Quercus lobata. Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and occasionally includes *Salvia leucophylla, Artemisia californica, Sambucus mexicana,* and *Hazardia squarrosa*. The herbaceous layer is diverse and often includes *Brassica nigra* and *Bromus diandrus.* Other herbs occasionally include *Hirschfeldia incana, Centaurea melitensis, Lactuca serriola, Eriogonum elongatum, Bromus hordeaceus, Lessingia filaginifolia, Leymus condensatus,* and *Marrubium vulgare.*

***Quercus lobata-Quercus agrifolia*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	12.3	1	47	X	X	
	QULO-T	*Quercus lobata*	100	10.3	2	20	X	X	
	JUCA-T	*Juglans californica*	28	1.2	0.2	9			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	33	0.4	0.2	2.5			
Shrub									
	SALE3	*Salvia leucophylla*	39	1.9	0.2	17			
	ARCA11	*Artemisia californica*	33	1.2	0.2	16			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	1			
	HASQ2	*Hazardia squarrosa*	22	0.6	0.2	8			
Herb									
	BRNI	*Brassica nigra*	78	4.8	0.2	20		X	X
	BRDI3	*Bromus diandrus*	67	7.9	1	28			X
	HIIN3	*Hirschfeldia incana*	39	1.8	2	10			X
	CEME2	*Centaurea melitensis*	39	1.5	0.2	13			X
	LASE	*Lactuca serriola*	28	0.3	0.2	2.5			X
	EREL6	*Eriogonum elongatum*	28	0.2	0.2	2.5			
	BRHO2	*Bromus hordeaceus*	22	0.6	0.2	5			X
	LEFI11	*Lessingia filaginifolia*	22	0.2	0.2	2.5			
	LECO12	*Leymus condensatus*	22	0.1	0.2	1			
	MAVU	*Marrubium vulgare*	22	0.1	0.2	1			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 7 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Hirschfeldia incana, Centaurea melitensis, Lactuca serriola, Bromus hordeaceus, Marrubium vulgare, Medicago polymorpha, Avena fatua, Carduus pycnocephalus, Cirsium vulgare, Avena, Melilotus indicus, Erodium cicutarium, Centaurea solstitialis, Lolium, Malva parviflora, Bromus madritensis, Salsola tragus, Galium aparine, Nicotiana glauca, Silybum marianum, Verbascum blattaria

Samples Used in Description: (n = 18)
AA0322cc, AA0539, AA0540, AA0792, AA1132, rap1241, rap1314, rap1434m, rap1505, rap1507, rap2450, rap2580, rap2628, rap2632, rap2676, rap2745, rap2796, rap2798

Comments:
This association is characterized by codominance of valley and coast live oak with a largely nonnative annual grass and herb understory. Two associations of this alliance occur in the study

area. Both represent the southernmost representation of this alliance. Interestingly, both associations also are represented throughout much of the full range of this alliance, occurring far north into northern California. The association name has been modified somewhat from Allen et al. (1991), where it was called *Quercus lobata*-*Q. agrifolia*/Grass. The renaming here suggests that it also includes annual forbs as well as grasses.

Phases:
None

COMMON NAME	Valley Oak-Coast Live Oak/Annual Grass Herb Woodland/Forest Association
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Quercus lobata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from central California to southern California ranging from Santa Clara County to Los Angeles County and inland to Kern, Merced, San Benito, and Santa Clara counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The association usually occurs on deep clay soils at elevations ranging from near sea level to more than 1,000 m (in the Tehachapi Mountains and northern coast range).

Vegetation Description:
These are moderately open woodlands to very open woodlands (10–50% tree cover), with a shared dominance of *Q. lobata* and *Q. agrifolia* along with a largely herbaceous understory of grasses and herbs.

Comments:
It remains to be seen if the presence of certain southern California shrubs, such as *Salvia leucophylla,* in about one-third of the samples is sufficient to differentiate the local stands from other similar stands in northern and central California.

References:
Allen et al. 1989, Sawyer and Keeler-Wolf 1995

Quercus lobata-Salix lasiolepis Woodland/Forest Association

Valley Oak-Arroyo Willow (provisional) Woodland/Forest Association
***Quercus lobata* Woodland/Forest Alliance**
Valley Oak Woodland/Forest Alliance

Mapping Code: 1324

Local Description

Summary:
This woodland/forest association occurs on gentle to moderate slopes with variable aspect at low elevations between 230 and 318 m. It is dominated by *Quercus lobata* in the overstory tree layer. *Salix lasiolepis* is present in either the tree or shrub layer, and *Quercus agrifolia* is often present in the understory tree layer. *Baccharis salicifolia* is abundant in the understory shrub layer, and a variety of grasses and forbs is found in the herbaceous layer. This is considered a provisional association because only three samples of this type have been collected.

Distribution:
This association is sampled in the Dry Inland and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 230–318 m, mean 239 m
Aspect: variable or flat/none
Slope: range 2–15 degrees, mean 6.3 degrees
Topography (micro; macro): concave; bottom to lower slopes
Litter Cover: range 35–65%, mean 55%
Small Rock Cover: range 5–8%, mean 7%
Large Rock Cover: range 2–2%, mean 2%
Bare Ground: range 10–35%, mean 20%
Parent Material: depositional or sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Quercus lobata-Salix lasiolepis* Woodland/Forest form an open to intermittent tree layer (25–60%, mean 42.3%) with hardwoods at 5–15 m tall, a sparse to open shrub layer (2–11%, mean 7.7%) at 0–2 m tall, and a sparse to open herbaceous layer (2–25%, mean 12%) at 0–1 m tall. Total vegetation cover is 60–65%, mean cover is 62%.

In this association, the tree layer is dominated by *Quercus lobata*. *Salix lasiolepis* is found in the tree or shrub layer with moderate to abundant cover. *Quercus agrifolia* is found in low cover in the understory tree layer, and *Salix laevigata* is occasionally included in the tree layer. The shrub layer is sparse to open and often includes *Baccharis salicifolia* and *Baccharis pilularis.* The herbaceous layer is simple and occasionally includes *Bromus diandrus* and *Rubus ursinus.*

***Quercus lobata-Salix lasiolepis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QULO-T	*Quercus lobata*	100	18.3	15	25	X	X	
	SALA3-T	*Salix laevigata*	33	2.5	7.5	7.5			
	JUCA-T	*Juglans californica*	33	0.8	2.5	2.5			
	PLRA	*Platanus racemosa*	33	0.8	2.5	2.5			
	QUAG-T	*Quercus agrifolia*	33	0.8	2.5	2.5			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	67	2.6	0.2	7.5			
	SALA6-T	*Salix lasiolepis*	33	7.3	22	22			
	SCMO	*Schinus molle*	33	0.8	2.5	2.5			X
	WASHI	*Washingtonia*	33	0.8	2.5	2.5			X
	QULO-L	*Quercus lobata*	33	0.3	1	1			
Shrub									
	BASA4	*Baccharis salicifolia*	67	4.2	5	7.5			
	BAPI	*Baccharis pilularis*	67	1.2	1	2.5			
	SALA6-M	*Salix lasiolepis*	33	8.3	25	25			
	SAME5	*Sambucus mexicana*	33	1.3	4	4			
	RHCA	*Rhamnus californica*	33	0.8	2.5	2.5			
	RHOV	*Rhus ovata*	33	0.8	2.5	2.5			
	ROCA2	*Rosa californica*	33	0.8	2.5	2.5			
	SALE3	*Salvia leucophylla*	33	0.3	1	1			
Herb									
	BRDI3	*Bromus diandrus*	33	1.7	5	5			X
	RUUR	*Rubus ursinus*	33	1.7	5	5			
	AMPS	*Ambrosia psilostachya*	33	0.8	2.5	2.5			
	LASE	*Lactuca serriola*	33	0.8	2.5	2.5			X
	RONA2	*Rorippa nasturtium-aquaticum*	33	0.8	2.5	2.5			X
	TYPHA	*Typha*	33	0.8	2.5	2.5			
	SIMA3	*Silybum marianum*	33	0.7	2	2			X
	PIMI3	*Piptatherum miliaceum*	33	0.3	1	1			X
	CLEL	*Clarkia elegans*	33	0.1	0.2	0.2			
	HIIN3	*Hirschfeldia incana*	33	0.1	0.2	0.2			X
	MAMA8	*Marah macrocarpus*	33	0.1	0.2	0.2			
	MEIN2	*Melilotus indicus*	33	0.1	0.2	0.2			X
	URDI	*Urtica dioica*	33	0.1	0.2	0.2			
	VIVI	*Vicia villosa*	33	0.1	0.2	0.2			X

Other Noteworthy Species:

Juglans californica was found in 1 of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Lactuca serriola, Rorippa nasturtium-aquaticum, Schinus molle, Silybum marianum, Piptatherum miliaceum, Hirschfeldia incana, Melilotus indicus, Vicia villosa

Samples Used in Description: (n = 3)
AA0102cc, AA0165cc, rap1715m

Comments:
Locally, the presence of arroyo and red willow in these stands may be relatively recent and a result of urban runoff.

Phases:
None

COMMON NAME	Valley Oak-Arroyo Willow (provisional) Woodland/Forest Association
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Quercus lobata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This provisional association is likely to occur elsewhere within the range of the *Quercus lobata* Alliance. Many stands of *Q. lobata* in the Sacramento Valley are true riparian stands. Although no associations have been defined with *Q. lobata* and S*. lasiolepis*, it is likely that this association

occurs elsewhere in the south and central coast ranges of California and possibly in the Sacramento and San Joaquin valleys as well.

References:
Holland 1986, Vaghti and Greco 2005

Salix laevigata-Salix lasiolepis Woodland/Forest Suballiance

Red Willow-Arroyo Willow Woodland/Forest Suballiance
***Salix laevigata* Woodland/Forest Alliance**
Red Willow Woodland/Forest Alliance

Mapping Code: 1410

Local Description

Summary:
This woodland/forest association occurs on flat to somewhat steep slopes with variable aspects at elevations between 69 and 334 m. It is dominated by *Salix laevigata* and *S. lasiolepis* in both the tree and shrub layers. A variety of grasses and forbs occurs in the herbaceous layer at low cover.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains, Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, and Immediate Coast of the study area.

Environmental Description:
Elevation: range 69–334 m, mean 224 m
Aspect: variable but more often flat
Slope: range 0–15 degrees, mean 5.5 degrees
Topography (micro; macro): concave or flat; bottom to lower slopes
Litter Cover: range 40–90%, mean 68.3%
Small Rock Cover: range 0–25%, mean 9.3%
Large Rock Cover: range 0–15%, mean 4.3%
Bare Ground: range 0–20%, mean 12.5%
Parent Material: often depositional, occasionally sedimentary or igneous
Soil Texture: coarse loamy sand to moderately fine silty clay loam

Vegetation Description:
Stands of *Salix laevigata-Salix lasiolepis* Woodland/Forest form a sparse to intermittent tree layer (0–66%, mean 37.9%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall, a sparse to intermittent shrub layer (0–60%, mean 11.9%) at 0–10 m tall, and a sparse to open herbaceous layer (0–25%, mean 4.7%) at 0–5 m tall. Total vegetation cover is 30–65%, mean cover is 54.4%.

In this association, the tree layer is dominated by *Salix laevigata* and *S. lasiolepis. Quercus agrifolia* occasionally is included in this layer. The shrub layer is sparse to intermittent and occasionally includes *Baccharis pilularis, Eriogonum fasciculatum,* and *Baccharis salicifolia*. The herbaceous layer includes a variety of grasses and forbs at low cover and frequency including *Piptatherum miliaceum, Arundo donax, Typha* sp*., Bromus* sp*., Equisetum* sp., and *Leymus condensatus*.

***Salix laevigata-Salix lasiolepis* Suballiance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALIX-T	*Salix laevigata/S. lasiolepis*	71	25.5	17	59	X		
	QUAG-T	*Quercus agrifolia*	36	1.4	2	8			
	SCMO	*Schinus molle*	21	1	2	8			X
Shrub									
	BAPI	*Baccharis pilularis*	36	1.7	0.2	10			
	ERFA2	*Eriogonum fasciculatum*	21	0.4	0.2	3			
	BASA4	*Baccharis salicifolia*	21	0.1	0.2	1			
Herb									
	PIMI3	*Piptatherum miliaceum*	21	0.3	0.2	2			X

Other Noteworthy Species:
Juglans californica was found in 3 of 14 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Schinus molle, Piptatherum miliaceum, Arundo donax, Hirschfeldia incana, Robinia, Ricinus communis, Cortaderia, Tamarix, Bromus diandrus, Foeniculum vulgare, Myoporum laetum, Phoenix canariensis, Rorippa nasturtium-aquaticum, Ulmus parvifolia

Samples Used in Description: (n = 14)
AA0144cc, AA0354, AA0422, AA0501, AA0507, AA0571, rap1744, rap2151, rap2152, rap2231m, rap2347, rap2577, rap2719, rap2720

Comments:
Salix laevigata and *S. lasiolepis* were sometimes difficult to identify in the field, so their cover estimates were combined into one value in the species list. This is considered a suballiance in which further variation must be defined via complete species inventory. Urban runoff may contribute to the existence of this type.

Phases:
None

COMMON NAME	Red Willow-Arroyo Willow Woodland/Forest Suballiance
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix laevigata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3?

Global Description

Distribution:
This vegetation type has also been described in northern California from the Suisun Marsh, and an association of these two willow species with an understory species associate is described in southern California. It likely occurs in many areas of California and potentially adjacent states.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This vegetation type occurs in permanently to intermittently flooded channels, stream banks, and sloughs.

Vegetation Description:
In Suisun Marsh and southern California, an association is defined by a codominance of S*. laevigata* and *S. lasiolepis*.

Comments:
This mixed red and arroyo willow type as defined in the Santa Monica Mountains clearly needs further definition based on species composition.

References:
Evens and San 2005, Klein and Evens 2005, Keeler-Wolf and Vaghti 2000

Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus/Annual Grass-Herb Woodland/Forest Association

Red Willow-Arroyo Willow/Douglas Mugwort-California Blackberry/Annual Grass-Herb (Provisional) Woodland/Forest Association
***Salix laevigata* Woodland/Forest Alliance**
Red Willow Woodland/Forest Alliance

Mapping Code: 1413

Local Description

Summary:
This woodland/forest association occurs on flat to gentle slopes with no or variable aspect at low elevations between 237 and 325 m. *Salix laevigata* and *S. lasiolepis* dominate in the tree, understory tree, and shrub layers. *Bromus diandrus, Rubus ursinus, Artemisia douglasiana,* and *Marrubium vulgare* are constants in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 237–325 m, mean 293 m
Aspect: variable but more often flat
Slope: range 0–3 degrees, mean 1.7 degrees
Topography (micro; macro): flat or concave; bottom slopes
Litter Cover: range 60–85%, mean 73.3%
Small Rock Cover: range 0–10%, mean 4%
Large Rock Cover: range 0–3%, mean 1%
Bare Ground: range 5–30%, mean 15%
Parent Material: depositional or sedimentary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus/*Annual Grass-Herb Woodland/Forest form an intermittent tree layer (33–40%, mean 35.3%) with hardwoods at 5–15 m tall, a sparse to open shrub layer (0–15%, mean 5%) at 0.5–5 m tall, and a sparse to open herbaceous layer (5–15%, mean 11%) at 0–1 m tall. Total vegetation cover is 43–51%, mean cover is 47.3%.

In this association, the tree layer is dominated by *Salix,* most likely both *Salix laevigata* and *S. lasiolepis. Quercus lobata* is occasionally included in this layer and the understory at low cover, and *Quercus agrifolia* is often in the understory at low cover. The sparse to open shrub layer is dominated by *Salix* sp., and *Baccharis salicifolia* and *Salvia spathacea* are often present. The herbaceous layer is diverse and includes a variety of grasses and forbs, in which *Bromus diandrus, Rubus ursinus, Artemisia douglasiana,* and *Marrubium vulgare* characteristically occur.

***Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALIX-T	*Salix laevigata/S. lasiolepis*	100	29.7	19	39	X	X	
	QULO-T	*Quercus lobata*	33	0.3	1	1			
Tree Understory									
	QUAG-L	*Quercus agrifolia*	67	0.1	0.2	0.2			
	QUAG-M	*Quercus agrifolia*	67	0.1	0.2	0.2			
	QULO-L	*Quercus lobata*	33	0.1	0.2	0.2			
	QULO-M	*Quercus lobata*	33	0.1	0.2	0.2			
	SALIX	*Salix laevigata/S. lasiolepis*	33	0.1	0.2	0.2			
Shrub									
	SALIX-M	*Salix laevigata/S. lasiolepis*	67	5.3	2	14	X		
	BASA4	*Baccharis salicifolia*	67	0.1	0.2	0.2			
	SASP3	*Salvia spathacea*	67	0.1	0.2	0.2			
	TODI	*Toxicodendron diversilobum*	33	1.3	4	4			
	ARCA11	*Artemisia californica*	33	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	33	0.1	0.2	0.2			
	GERAN	*Geranium*	33	0.1	0.2	0.2			
	LONIC	*Lonicera*	33	0.1	0.2	0.2			
	RIMA	*Ribes malvaceum*	33	0.1	0.2	0.2			
	SALE3	*Salvia leucophylla*	33	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	0.2			
Herb									
	BRDI3	*Bromus diandrus*	100	4.7	0.2	8		X	X
	RUUR	*Rubus ursinus*	100	4.1	0.2	11		X	
	ARDO3	*Artemisia douglasiana*	100	1.3	1	2		X	
	MAVU	*Marrubium vulgare*	100	0.2	0.2	0.2		X	X
	PIMI3	*Piptatherum miliaceum*	67	2.1	0.2	6			X
	BRNI	*Brassica nigra*	67	0.1	0.2	0.2			X
	BRCA5	*Bromus carinatus*	67	0.1	0.2	0.2			
	CIVU	*Cirsium vulgare*	67	0.1	0.2	0.2			X
	GAAP2	*Galium aparine*	67	0.1	0.2	0.2			X
	MAMA8	*Marah macrocarpus*	67	0.1	0.2	0.2			
	MEIN2	*Melilotus indicus*	67	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	67	0.1	0.2	0.2			X
	SOAS	*Sonchus asper*	67	0.1	0.2	0.2			X
	SOOL	*Sonchus oleraceus*	67	0.1	0.2	0.2			X
	CLEMA	*Clematis*	33	0.3	1	1			
	EUTE10	*Euphorbia terracina*	33	0.3	1	1			X
	VELA	*Verbena lasiostachys*	33	0.3	1	1			
	AMPS	*Ambrosia psilostachya*	33	0.1	0.2	0.2			
	ANAR	*Anagallis arvensis*	33	0.1	0.2	0.2			X
	ANCO2	*Anthemis cotula*	33	0.1	0.2	0.2			X
	BRHO2	*Bromus hordeaceus*	33	0.1	0.2	0.2			X
	ERCI6	*Erodium cicutarium*	33	0.1	0.2	0.2			X
	EUCH	*Eucrypta chrysanthemifolia*	33	0.1	0.2	0.2			

JUNCU	*Juncus*	33	0.1	0.2	0.2	
LASE	*Lactuca serriola*	33	0.1	0.2	0.2	X
MELIL	*Melilotus*	33	0.1	0.2	0.2	X
PHAU4	*Pholistoma auritum*	33	0.1	0.2	0.2	

***Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
	POACXX	*Poaceae*	33	0.1	0.2	0.2			
	RONA2	*Rorippa nasturtium-aquaticum*	33	0.1	0.2	0.2			X
	SISYM	*Sisymbrium*	33	0.1	0.2	0.2			X
	SONCH	*Sonchus*	33	0.1	0.2	0.2			X
	TYPHA	*Typha*	33	0.1	0.2	0.2			
	URDI	*Urtica dioica*	33	0.1	0.2	0.2			
	VEAN2	*Veronica anagallis-aquatica*	33	0.1	0.2	0.2			X
	VULPI	*Vulpia*	33	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Marrubium vulgare, Piptatherum miliaceum, Brassica nigra, Cirsium vulgare, Galium aparine, Melilotus indicus, Rumex crispus, Sonchus asper, Sonchus oleraceus, Euphorbia terracina, Bromus hordeaceus, Anagallis arvensis, Anthemis cotula, Erodium cicutarium, Lactuca serriola, Melilotus, Rorippa nasturtium-aquaticum, Sisymbrium, Sonchus, Veronica anagallis-aquatica

Samples Used in Description: (n = 3)
rap2752rlv, rap2856rlv, rap2857rlv

Comments:
Salix laevigata and *S. lasiolepis* were sometimes difficult to identify in the field, so their cover estimates were combined into one value in the species list. This association should remain provisional until resampling can occur in which all willow species are clearly identified. The presence of *Quercus agrifolia* seedlings and saplings in two-thirds of the plots suggests a relationship to the *Quercus agrifolia-Salix lasiolepis A*ssociation of the coast live oak alliance.

Phases:
None

COMMON NAME	Red Willow-Arroyo Willow/Douglas Mugwort-California Blackberry/Annual Grass-Herb (Provisional) Woodland/Forest Association
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix laevigata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region; however, a comparable association of *S. laevigata-S. lasiolepis/Artemisia douglasiana* is defined in western Riverside and San Diego counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The comparable association occurs in southern California within intermittently to seasonally flooded riparian corridors of lower elevations from 100 to 1,540 m on mixed alluvial sediments.

Vegetation Description:
Salix laevigata occurs as a tree overstory dominant, and *S. lasiolepis* occurs as a tree overstory codominant or shrub understory dominant. Other trees infrequently occur at low cover including *Platanus racemosa, Populus fremontii,* and *Quercus agrifolia.* Common understory shrubs include *Baccharis salicifolia*, *Rubus ursinus,* and *Rosa californica.* A wide variety of herb species occupy the understory, with *Artemisia douglasiana* characteristically present. Other herbs often occur including *Mimulus guttatus, Ambrosia psilostachya, Bromus diandrus, B. hordeaceus, Hirschfeldia incana, Lolium multiflorum,* and *Urtica dioica.*

Comments:
The association defined in this Santa Monica Mountains report is comparable to the *S. laevigata-S. lasiolepis/Artemisia douglasiana* Association defined from western Riverside and San Diego counties, and these two could probably collapse into one association.

References:
Evens and San 2005, Klein and Evens 2005

Salix laevigata-Salix lasiolepis/Baccharis salicifolia Woodland/Forest Association

Red Willow-Arroyo Willow/Mule Fat Woodland/Forest Association
***Salix laevigata* Woodland/Forest Alliance**
Red Willow Woodland/Forest Alliance

Mapping Code: 1412

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with little influence of aspect (being flat to variable in nature) and at elevations between 73 and 303 m. It is dominated by *Salix laevigata* in the overstory tree layer and *Salix lasiolepis* in the understory tree layer. It has an open cover of *Baccharis salicifolia* in the understory shrub layer and an open cover of various grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Simi Hills Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 73–303 m, mean 241.8 m
Aspect: variable but often flat
Slope: range 2–15 degrees, mean 5.7 degrees
Topography (micro; macro): flat or concave; bottom slopes
Litter Cover: range 55–80%, mean 70%
Small Rock Cover: range 1–30%, mean 12%
Large Rock Cover: range 1–20%, mean 6.3%
Bare Ground: range 10–20%, mean 15%
Parent Material: often depositional, occasionally sedimentary
Soil Texture: coarse loamy sand to fine sandy clay

Vegetation Description:
Stands of *Salix laevigata-Salix lasiolepis/Baccharis salicifolia* Woodland/Forest form an open to intermittent tree layer (14–50%, mean 25.1%) with hardwoods at 5–10 m tall, a sparse to open shrub layer (4–28%, mean 14.3%) at 0–5 m tall, and a sparse to open herbaceous layer (2–18%, mean 9.9%) at 0–1 m tall. Total vegetation cover is 42–51%, mean cover is 47.3%.

In this association, the overstory tree layer is dominated by *Salix laevigata. Salix lasiolepis* is dominant in the understory tree layer. The shrub layer is sparse to open and is dominated by *Baccharis salicifolia*. The herbaceous layer is diverse and often includes *Hirschfeldia incana* and *Artemisia douglasiana.* Other herbs occasionally include *Typha* sp., *Piptatherum miliaceum, Carduus pycnocephalus,* and *Foeniculum vulgare.*

Salix laevigata-Salix lasiolepis/Baccharis salicifolia Association

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALA3-T	*Salix laevigata*	71	12.1	10	23	X		
	PLRA	*Platanus racemosa*	43	0.6	0.2	2			
	QULO-T	*Quercus lobata*	29	0.9	0.2	6			
	QUAG-T	*Quercus agrifolia*	29	0.6	0.2	4			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	71	7.4	5	17	X		
Shrub									
	BASA4	*Baccharis salicifolia*	100	11.1	3	25	X	X	
	BAPI	*Baccharis pilularis*	29	0.2	0.2	1			
Herb									
	HIIN3	*Hirschfeldia incana*	57	1.3	0.2	8			X
	ARDO3	*Artemisia douglasiana*	57	1.3	1	3			
	TYPHA	*Typha*	43	1.3	0.2	5			
	PIMI3	*Piptatherum miliaceum*	43	0.5	0.2	3			X
	UNHE	Unknown Herbs/Forbs	29	1.3	2	7			
	CAPY2	*Carduus pycnocephalus*	29	0.2	0.2	1			X
	FOVU	*Foeniculum vulgare*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Dudleya cymosa was found in 1 of 7 surveys of this plant community, which could be one of the rare subspecies such as *D. C.* subsp. *ovatifolia, D. C.* subsp. *marcescens,* or *D. C.* subsp. *agourensis.* Regionally, the park considers these three species as Rare. CNPS ranks them as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G5T2 or G5T1, and state rank is S2.2 or S1.2. Federal listing is Threatened, and state listing is none or Rare (CNPS 2005, SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Piptatherum miliaceum, Carduus pycnocephalus, Foeniculum vulgare, Bromus diandrus, Centaurea melitensis, Conyza canadensis, Schinus molle, Brassica nigra, Conium maculatum, Dactylis glomerata, Ricinus communis, Bromus hordeaceus, Marrubium vulgare, Melilotus albus, Sonchus

Samples Used in Description: (n = 7)
AA0582, AA0658, rap1716, rap2491, rap2643, rap2672, rap2685

Comments:
The presence of *Platanus racemosa* in almost half the plots and the ubiquitous presence of *Baccharis salicifolia* suggest an ecological setting similar to the *Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana* Woodland/Forest Association. The presence of *Salix* species suggests an increase in water availability from the *Platanus*-dominated analog mentioned above. This water may be the result of nonnatural augmentation from runoff from irrigation of private homes, golf courses, wastewater treatment facilities, and so forth.

Phases:
None

COMMON NAME Red Willow-Arroyo Willow/Mule Fat Woodland/Forest Association

SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix laevigata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory; however, similar associations are likely to exist elsewhere in California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The association in this report has all willow species identified and is clearly related to the other *Salix laevigata-S. lasiolepis* vegetation described in other reports.

References:
Keeler-Wolf and Vaghti 2000, Evens and San 2005, Klein and Evens 2005

Salix lasiolepis Woodland/Forest Alliance

Aroyo Willow Woodland/Forest Alliance

Mapping Code: 1430

Local Description

Summary:
Five stands of this woodland/forest alliance occur usually on relatively flat surfaces with little or no exposure at low elevations between 13 and 251 m. It is dominated by *Salix lasiolepis* as a small tree in the overstory layer. *Baccharis pilularis* and *Malosma laurina* occur often in the understory shrub layer, and *Typha* sp. often occurs in the herbaceous layer.

Distribution:
The five surveys classified to the alliance level occur in the Immediate Coast and Lower Elevation Inland Santa Monica Mountains regions of the study area; however, other association data shows the alliance occurring within all regions of the study area except Eastern Urban.

Environmental Description:
Elevation: range 13–251 m, mean 149.4 m
Aspect: usually none (usually flat), rarely southwest
Slope: range 0–35 degrees, mean 6.8 degrees
Topography (micro; macro): concave or flat; bottom to lower slope
Litter Cover: range 5.0–85%, mean 60.0%
Small Rock Cover: range 1–55%, mean 11.8%
Large Rock Cover: range 0–15%, mean 2.2%
Bare Ground: range 1–60%, mean 18.8%
Parent Material: depositional
Soil Texture: sandy to fine silty clay

Vegetation Description:
Stands of *Salix lasiolepis* Woodland/Forest Alliance form an open to intermittent tree layer (0–65%, mean 31.3%) with hardwoods at 0–10 m tall, an open to intermittent shrub layer (0–58%, mean 12.8%) at 0–10 m tall, and an open to intermittent herbaceous layer (0–37%, mean 6.6%) at 0–2 m tall. Total vegetation cover is 15–78%, mean cover is 49.3%.

In this alliance, the tree layer is dominated by *Salix lasiolepis* as a small tree. Other trees occur infrequently at low cover including *Juglans californica*, *Alnus rhombifolia, Platanus racemesa,* and *Washingtonia*. The shrub layer is open to intermittent and often includes *Baccharis pilularis* and *Malosma laurina.* Occasionally, the shrub layer includes *Myoporum laetum, Ricinus communis,* and *B. salicifolia*. The herbaceous layer is diverse and may be dominated by *Typha* and/or *Scirpus* spp. Other herbs include *Leymus condensatus, Arundo donax,* and many others.

***Salix lasiolepis* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALIX-T	*Salix*	20	7.0	35.0	35.0			
	JUCA-T	*Juglans californica*	20	1.5	7.5	7.5			
	ALRH2-T	*Alnus rhombifolia*	20	0.2	1.0	1.0			
	PLRA	*Platanus racemosa*	20	0.2	1.0	1.0			
	EUCAL-T	*Eucalyptus*	20	0.0	0.2	0.2			X
Tree Understory									
	SALA6-T	*Salix lasiolepis*	60	11.2	4.0	45.0	X		
	WASHI	*Washingtonia*	20	0.4	2.0	2.0			X
Shrub									
	BAPI	*Baccharis pilularis*	60	2.5	0.2	7.5			
	MALA6	*Malosma laurina*	60	1.5	0.2	5.0			
	MYLA5	*Myoporum laetum*	40	0.6	0.2	3.0			X
	RICO3	*Ricinus communis*	40	0.2	0.2	1.0			X
	BASA4	*Baccharis salicifolia*	40	0.1	0.2	0.2			
	SALA6-M	*Salix lasiolepis*	20	3.0	15.0	15.0			
	TODI	*Toxicodendron diversilobum*	20	0.5	2.5	2.5			
	ARCA11	*Artemisia californica*	20	0.4	2.0	2.0			
	ATLE	*Atriplex lentiformis*	20	0.2	1.0	1.0			
	ENCA	*Encelia californica*	20	0.2	1.0	1.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.2	1.0	1.0			
	ISME5	*Isocoma menziesii*	20	0.0	0.2	0.2			
	NIGL	*Nicotiana glauca*	20	0.0	0.2	0.2			X
Herb									
	TYPHA	*Typha*	60	7.4	2.0	25.0	X		
	LECO12	*Leymus condensatus*	40	1.7	2.5	6.0			
	ARDO4	*Arundo donax*	40	1.0	2.0	3.0			X
	SCIRP	*Scirpus*	20	2.4	12.0	12.0			
	ARDO3	*Artemisia douglasiana*	20	0.5	2.5	2.5			
	OXALI	*Oxalis*	20	0.4	2.0	2.0			
	UNHE	Unknown Herbs/Forbs	20	0.4	2.0	2.0			
	BRNI	*Brassica nigra*	20	0.2	1.0	1.0			X
	ERODI	*Erodium*	20	0.2	1.0	1.0			X
	FOVU	*Foeniculum vulgare*	20	0.2	1.0	1.0			X
	AGAVE	*Agave*	20	0.0	0.2	0.2			X
	BRDI3	*Bromus diandrus*	20	0.0	0.2	0.2			X
	CHENO	*Chenopodium*	20	0.0	0.2	0.2			
	LUPIN	*Lupinus*	20	0.0	0.2	0.2			
	MASA2	*Malacothrix saxatilis*	20	0.0	0.2	0.2			
	MAPA5	*Malva parviflora*	20	0.0	0.2	0.2			X
	PHCI	*Phacelia cicutaria*	20	0.0	0.2	0.2			
	PIMI3	*Piptatherum miliaceum*	20	0.0	0.2	0.2			X
	POOL	*Portulaca oleracea*	20	0.0	0.2	0.2			X

Other Noteworthy Species:

Juglans californica was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Arundo donax, Myoporum laetum, Ricinus communis, Brassica nigra, Erodium, Foeniculum vulgare, Bromus diandrus, Eucalyptus, Malva parviflora, Nicotiana glauca, Piptatherum miliaceum, Portulaca oleracea

Samples Used in Description: (n = 5)
AA0280cc, AA0579, rap0967, rap1124, rap2749m

Comments:
Five stands were not classified below the alliance level and are represented here (separately from the associations also described). This alliance is typically considered a shrub type in the national vegetation classification, but most stands locally are dominated by trees and warranted description. Most of these five stands sampled locally were associated with higher than normal growing season water as a result of irrigation or runoff. This may have accounted for the relatively high frequency of *Typha* and *Scirpus* spp. in the understory. Identification of some willow tree species was uncertain in a minority of samples but was likely to be of this species.

Phases:
None

COMMON NAME	Arroyo Willow
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrub land
FORMATION	III.B.2.N.d. Temporarily flooded cold-deciduous shrubland
ALLIANCE	*Salix lasiolepis* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This alliance is locally common along creeks, stream terraces, and seeps in Nevada, southwestern Utah, Arizona, New Mexico, east of the Cascade Mountains in Washington, and California.

Nations:
United States

States or Provinces:
AZ, CA, NM, NV, UT, WA

Environmental Description:
Communities within this alliance occupy stream benches and occasionally seeps. They can form stringer communities along drainages with slopes ranging between 1 to 15%. Elevations range between 1,200 m to 2,490 m. Soils are xeric and developed on alluvium. Water tables were rarely reached within the depth of soil pits, and mottles were not evident because of the coarse soil texture.

Vegetation Description:
The tall shrub layer is dominated by *Salix lasiolepis* that forms a dense overstory ranging from 60–100%. *Ribes aureum* and *Rosa woodsii* typically form a low shrub layer near the base of the willows. The undergrowth is typically sparse with *Clematis ligusticifolia* and *Smilacina stellata* present in minor amounts. Bare ground and/or leaf litter from the willow overstory are characteristic of stands within this alliance.

Comments:
In California, this is probably the most common willow alliance below 1,000 m west of the Sierra-Cascade and desert divides. It is particularly common along streams and creeks in the California coast ranges.

References:
Manning and Padgett 1995, NatureServe 2005, Padgett et al. 1989, Sawyer and Keeler-Wolf 1995

Salix lasiolepis/Baccharis salicifolia Woodland/Forest Association

Aroyo Willow/Mule Fat Woodland/Forest Association
***Salix lasiolepis* Woodland/Forest Alliance**
Aroyo Willow Woodland/Forest Alliance

Mapping Code: 1432

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes that are often flat and at elevations between 3 and 413 m. It is dominated by *Salix lasiolepis* in the understory tree layer, *Baccharis salicifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Western Fog Zone, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 3–413 m, mean 187.2 m
Aspect: often flat, occasionally variable, northeast or northwest
Slope: range 0–15 degrees, mean 5.8 degrees
Topography (micro; macro): variable but often concave; bottom to upper slopes
Litter Cover: range 5–75%, mean 56%
Small Rock Cover: range 1–55%, mean 11.2%
Large Rock Cover: range 0–15%, mean 2.2%
Bare Ground: range 2–60%, mean 19.5%
Parent Material: often depositional, occasionally sedimentary or igneous
Soil Texture: silt to fine sandy clay

Vegetation Description:
Stands of *Salix lasiolepis/Baccharis salicifolia* Woodland/Forest form a sparse to intermittent tree layer (3–65%, mean 37.7%) with hardwoods at 2–10 m tall, a sparse to open shrub layer (0–30%, mean 9%) at 0–5 m tall, and a sparse to open herbaceous layer (0–14%, mean 6%) at 0–1 m tall. Total vegetation cover is 22–78%, mean cover is 50.7%.

In this association, *Salix lasiolepis* dominates in the understory tree layer. *Quercus agrifolia* is occasionally found in low cover in the overstory tree layer. The shrub layer is sparse to open and is dominated by *Baccharis salicifolia*. Occasionally, *Salix lasiolepis, Baccharis pilularis,* and *Ricinus communis* are also included. The herbaceous layer is diverse and occasionally includes *Artemisia douglasiana, Piptatherum miliaceum, Typha, Conium maculatum, Bromus diandrus, Arundo donax, Brassica nigra,* and *Centaurea melitensis.*

***Salix lasiolepis/Baccharis salicifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	1.3	0.2	17			
	PLRA	*Platanus racemosa*	33	0.5	0.2	3			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	90	30.8	3	55	X	X	
Shrub									
	BASA4	*Baccharis salicifolia*	86	3.5	0.2	17		X	
	SALA6-M	*Salix lasiolepis*	33	3.2	0.2	23			
	BAPI	*Baccharis pilularis*	29	0.7	0.2	7.5			
	RICO3	*Ricinus communis*	24	0.1	0.2	1			X
Herb									
	ARDO3	*Artemisia douglasiana*	48	1.7	0.2	9			
	PIMI3	*Piptatherum miliaceum*	33	0.4	0.2	6			X
	TYPHA	*Typha*	33	0.4	0.2	3			
	COMA2	*Conium maculatum*	29	0.5	0.2	8			X
	BRDI3	*Bromus diandrus*	29	0.5	0.2	8			X
	ARDO4	*Arundo donax*	29	0.4	0.2	5			X
	BRNI	*Brassica nigra*	29	0.3	0.2	3			X
	CEME2	*Centaurea melitensis*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 5 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Conium maculatum, Bromus diandrus, Arundo donax, Brassica nigra, Centaurea melitensis, Ricinus communis, Hirschfeldia incana, Euphorbia terracina, Foeniculum vulgare, Carduus pycnocephalus, Marrubium vulgare, Schinus molle, Vinca major, Brassica, Melilotus indicus, Sonchus oleraceus, Lactuca serriola, Bromus madritensis, Cirsium vulgare, Lolium, Tropaeolum majus, Conyza canadensis, Myoporum laetum, Acer negundo, Ailanthus altissima, Avena fatua, Cortaderia, Cotoneaster, Melilotus albus, Parthenocissus, Salsola tragus, Senecio mikanioides, Silybum marianum, Sonchus asper, Spartium junceum

Samples Used in Description: (n = 21)
AA0209cc, AA0246cc, AA0669, AA1127, rap0468, rap0561, rap1360, rap1433, rap1439m, rap1471, rap1483, rap1688, rap1690, rap1750, rap1752, rap1818, rap1916, rap1978, rap2044m, rap2211, rap2315

Comments:
The relatively simple species composition and the high proportion of nonnative species suggest that this association represents the more actively disturbed riparian settings locally.

Phases:
None

COMMON NAME	Aroyo Willow/Mule Fat Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix lasiolepis* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur elsewhere in central and southern California.

References:
None

Salix lasiolepis/Malosma laurina Woodland/Forest Association

Arroyo Willow/Laurel Sumac Woodland/Forest Association
***Salix lasiolepis* Woodland/Forest Alliance**
Aroyo Willow Woodland/Forest Alliance

Mapping Code: 1433

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes that are often south facing at elevations between 5 and 250 m. *Salix lasiolepis* is dominant in the understory tree and/or shrub layers, and *Malosma laurina* is codominant with the willow in the understory shrub layer. A variety of grasses and forbs, including *Leymus condensatus,* is dominant in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 5–250 m, mean 99 m
Aspect: often southeast and southwest, occasionally northwest
Slope: range 4–35 degrees, mean 16.3 degrees
Topography (micro; macro): concave or flat; bottom to mid slopes
Litter Cover: range 70–70%, mean 70%
Small Rock Cover: range 1–25%, mean 11.8%
Large Rock Cover: range 0–7%, mean 2.4%
Bare Ground: range 1–30%, mean 14.2%
Parent Material: sedimentary, igneous, or depositional
Soil Texture: moderately fine sandy clay loam to moderately fine silty clay loam

Vegetation Description:
Stands of *Salix lasiolepis/Malosma laurina* Woodland/Forest form a sparse to intermittent tree layer (0–49%, mean 15%) with hardwoods at 0–10 m tall, a sparse to intermittent shrub layer (9–58%, mean 31.2%) at 0–10 m tall, and a sparse to open herbaceous layer (0–15%, mean 3.5%) at 0–1 m tall. Total vegetation cover is 30–62%, mean cover is 49.2%.

In this association, *Salix lasiolepis* is dominant in the understory tree and/or shrub layers. *Juglans californica* is abundant in the understory. The shrub layer is sparse to intermittent and is codominated by *Malosma laurina* as well as the willow. Frequently, *Baccharis pilularis, Baccharis salicifolia, Artemisia californica,* and *Encelia californica* are also included. The herbaceous layer is diverse and occasionally includes *Leymus condensatus, Juncus* sp.*, Rubus ursinus, Centaurea melitensis,* and *Distichlis spicata* in low cover.

***Salix lasiolepis/Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	33	0.5	1	2			
Tree Understory									
	JUCA-M	*Juglans californica*	50	1.9	0.2	11			
	SALA6-T	*Salix lasiolepis*	33	6.3	12	26			
	SAME5	*Sambucus mexicana*	33	0.7	0.2	4			
Shrub									
	MALA6	*Malosma laurina*	100	9.5	2	25	X	X	
	BAPI	*Baccharis pilularis*	67	1.4	0.2	4			
	BASA4	*Baccharis salicifolia*	67	0.9	0.2	2			
	ARCA11	*Artemisia californica*	67	0.6	0.2	2			
	SALA6-M	*Salix lasiolepis*	50	10.8	5	30	X		
	ENCA	*Encelia californica*	50	1.4	0.2	7			
	MAFA	*Malacothamnus fasciculatus*	50	0.5	0.2	2			
	SAME3	*Salvia mellifera*	33	1	0.2	6			
	HEAR5	*Heteromeles arbutifolia*	33	0.7	1	3			
	TODI	*Toxicodendron diversilobum*	33	0.4	0.2	2			
Herb									
	LECO12	*Leymus condensatus*	67	1	0.2	3			

Other Noteworthy Species:
Juglans californica was found in 3 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Foeniculum vulgare, Arundo donax, Avena fatua, Brassica nigra, Cakile maritima, Carduus pycnocephalus, Cortaderia, Marrubium vulgare, Myoporum laetum, Nicotiana glauca, Pennisetum setaceum, Salsola tragus, Tamarix

Samples Used in Description: (n = 6)
rap0660, rap1017, rap1064, rap1243, rap2263, rap2311

Comments:
The combination of the typically upland xerophytic *Malosma laurina* with the hydrophytic *Salix lasiolepis* is indicative of disturbed alluvial settings on relatively steep slopes (relative to most riparian settings) with southerly aspects. This is often on steep cliffs in slumps or below houses where water availability is higher than normal because of urban runoff.

Phases:
None

COMMON NAME	Arroyo Willow/Laurel Sumac Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland

PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix lasiolepis* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Schinus molle Woodland/Forest Alliance

Peruvian Peppertree Woodland/Forest Alliance

Mapping Code: 9550

Local Description

Summary:
This woodland/forest alliance occurs on somewhat steep to steep slopes with no or variable exposure at low elevations between 186 and 300 m. It is dominated by the introduced *Schinus molle* in the tree layer. The understory shrub layer has a variety of fast growing species such as *Baccharis pilularis*, and the herbaceous layer is dominated by nonnative grasses and herbs.

Distribution:
This alliance is sampled in the Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 186–300 m, mean 254 m
Aspect: none (flat) to variable
Slope: range 15–35 degrees, mean 21.7 degrees
Topography (micro; macro): variable (flat, concave, convex, or undulating); bottom to top
Litter Cover: range 20.0–80%, mean 46.3%
Small Rock Cover: range 0–45%, mean 19.2%
Large Rock Cover: range 0–1%, mean 0.2%
Bare Ground: range 10–54%, mean 29.5%
Parent Material: sedimentary or depositional
Soil Texture: coarse loamy sand to fine sandy clay loam

Vegetation Description:
Stands of *Schinus molle* Woodland/Forest Alliance form an open to intermittent tree layer (3–52%, mean 18.7%) with conifers at 0–10 m tall and hardwoods at 2–10 m tall, an open to intermittent shrub layer (0–36%, mean 10.4%) at 0–5 m tall, and an open to intermittent herbaceous layer (0–40%, mean 10.3%) at 0–1 m tall. Total vegetation cover is 27–55%, mean cover is 39%.

In this alliance, the tree layer is dominated by *Schinus molle* as an invasive species. *Pinus* sp. also has been introduced with low cover. *Quercus agrifolia* is infrequently included in this layer. The shrub layer is usually open and characterized by *Baccharis pilularis* at low cover. A variety of other shrubs is occasionally present at low cover including *Salvia leucophylla, Artemisia californica, Encelia californica, Eriogonum fasciculatum,* and *Malosma laurina*. The herbaceous layer is simple to diverse including many nonnative species such as *Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Brassica nigra,* and *Carduus pycnocephalus.*

***Schinus molle* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SCMO	*Schinus molle*	89	14.3	2.0	35.0	X	X	X
	PINUS	*Pinus*	56	0.4	0.2	1.0			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	22	0.1	0.2	1.0			
Shrub									
	BAPI	*Baccharis pilularis*	78	1.0	0.2	6.0		X	
	SALE3	*Salvia leucophylla*	44	0.7	0.2	4.0			
	ARCA11	*Artemisia californica*	33	0.4	0.2	2.0			
	ENCA	*Encelia californica*	33	0.3	0.2	2.0			
	ERFA2	*Eriogonum fasciculatum*	33	0.2	0.2	1.0			
	LOSC2	*Lotus scoparius*	33	0.2	0.2	1.0			
	MALA6	*Malosma laurina*	33	0.1	0.2	0.2			
	NIGL	*Nicotiana glauca*	22	0.6	0.2	5.0			X
	BASA4	*Baccharis salicifolia*	22	0.4	0.2	3.0			
	SAME5	*Sambucus mexicana*	22	0.2	0.2	2.0			
Herb									
	CEME2	*Centaurea melitensis*	67	1.6	1.0	5.0			X
	HIIN3	*Hirschfeldia incana*	44	1.5	0.2	8.0			X
	BRMA3	*Bromus madritensis*	44	0.6	0.2	2.0			X
	BRNI	*Brassica nigra*	44	0.6	1.0	2.0			X
	CAPY2	*Carduus pycnocephalus*	33	0.5	0.2	4.0			X
	BRDI3	*Bromus diandrus*	22	1.3	1.0	11.0			X
	CAMA24	*Calystegia macrostegia*	22	0.0	0.2	0.2			
	LASE	*Lactuca serriola*	22	0.0	0.2	0.2			X
	MAVU	*Marrubium vulgare*	22	0.0	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Schinus molle, Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Brassica nigra, Carduus pycnocephalus, Bromus diandrus, Nicotiana glauca, Lactuca serriola, Marrubium vulgare, Carpobrotus chilensis, Rosmarinus officinalis, Acacia redolens, Schinus molle, Olea europaea, Avena fatua, Nerium oleander, Avena, Pennisetum setaceum, Rosa, Salsola tragus, Conyza canadensis, Melilotus albus, Melilotus indicus, Ricinus communis

Samples Used in Description: (n = 9)
rap1446, rap1930, rap1977, rap2045, rap2048, rap2049, rap2212, rap2213, rap2214

Comments:
This is the first time *Schinus molle* has been identified as an alliance in California. These stands are clearly self-perpetuating and are often found invading *Opuntia* stands.

Phases:
None

COMMON NAME	Alliance only
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.1. Tropical or subtropical broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.1.N. Natural/Seminatural tropical or subtropical broad-leaved evergreen shrubland
FORMATION	III.A.1.N.a. Tropical or subtropical broad-leaved evergreen shrubland
ALLIANCE	*Schinus molle* Woodland/Forest Alliance (Provisional)
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	An introduced species

Global Description

Distribution:
This alliance is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This is a common introduced tree of central and southern coastal California, originally from the Peruvian Andes. Its seeds occur in fruits that are bird dispersed, and resulting small stands are occasional in south coastal California. It typically forms small open stands with coastal scrub in the more interior portions of the Santa Monica Mountains and Simi Valley areas. Although it is not commonly considered as invasive as the related *Schinus terebinthifolius* (Brazilian peppertree) that is an introduced alliance in Hawaii, Florida, and Texas, it is clearly reproducing and colonizing on its own in the Santa Monica Mountains region.

References:
NatureServe 2005

Umbellularia californica/Ceanothus oliganthus Woodland/Forest Association

California Bay/Hairy Leaf Ceanothus (Provisional) Woodland/Forest Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1012

Local Description

Summary:
This woodland/forest association occurs on steep slopes that are northwest or southeast facing (neutral slopes) at low to mid elevations between 499 and 812 m. It is dominated by *Umbellularia californica* in the tree layer, *Ceanothus oliganthus* in the understory shrub layer, and grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 499–812 m, mean 697 m
Aspect: often northwest, occasionally southeast
Slope: range 27–35 degrees, mean 31.2 degrees
Topography (micro; macro): variable; mid to upper slopes
Litter Cover: no data
Small Rock Cover: range 0–20%, mean 10%
Large Rock Cover: range 0–8%, mean 4.3%
Bare Ground: range 0–5%, mean 3.3%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to fine clay

Vegetation Description:
Stands of *Umbellularia californica/Ceanothus oliganthus* Woodland/Forest form an open to intermittent tree layer (22–50%, mean 34.3%) with hardwoods at 2–10 m tall, an open to intermittent shrub layer (20–40%, mean 28.3%) at 0–5 m tall, and a sparse to open herbaceous layer (0–10%, mean 2.5%) at 0–1 m tall. Total vegetation cover is 58–68%, mean cover is 62.8%.

In this association, the overstory and understory tree layers are dominated by *Umbellularia californica*. *Quercus agrifolia* is frequently included in the overstory tree layer at relatively low cover. The shrub layer is sparse to open and is dominated by *Ceanothus oliganthus*, and *Heteromeles arbutifolia* is also characteristically present in low average cover. Occasionally, *Prunus ilicifolia, Lupinus longifolius,* and *Rhus ovata* are also included. The herbaceous layer is simple and includes *Leymus condensatus, Bromus madritensis, Clematis,* and *Pellaea mucronata* at low cover and constancy.

***Umbellularia californica/Ceanothus oliganthus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	75	12.8	3	28	X	X	
	QUAG-T	*Quercus agrifolia*	75	4.5	1	12		X	
	JUCA-T	*Juglans californica*	25	0.3	1	1			
Tree Understory									
	UMCA-M	*Umbellularia californica*	50	16.8	32	35	X		
Shrub									
	CEOL	*Ceanothus oliganthus*	100	17	3	27	X	X	
	HEAR5	*Heteromeles arbutifolia*	100	3.8	1	12		X	
	PRIL	*Prunus ilicifolia*	50	1.5	1	5			
	LULO	*Lupinus longifolius*	50	0.8	0.2	3			
	RHOV	*Rhus ovata*	50	0.6	0.2	2			
	KECO	*Keckiella cordifolia*	25	2	8	8			
	CEME	*Ceanothus megacarpus*	25	0.8	3	3			
	TODI	*Toxicodendron diversilobum*	25	0.5	2	2			
	LEFR	*Lepechinia fragrans*	25	0.3	1	1			
	LONIC	*Lonicera*	25	0.3	1	1			
	QUBE5	*Quercus berberidifolia*	25	0.3	1	1			
	ADSP	*Adenostoma sparsifolium*	25	0.1	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	25	0.1	0.2	0.2			
	RIMA	*Ribes malvaceum*	25	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	25	2.5	10	10			
	BRMA3	*Bromus madritensis*	25	0.1	0.2	0.2			X
	CLEMA	*Clematis*	25	0.1	0.2	0.2			
	PEMU	*Pellaea mucronata*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 1 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus madritensis

Samples Used in Description: (n = 4)
rap0577, rap0625, rap0791, rap2355m

Comments:
This provisional association is likely to occur in other parts of the south coast ranges north to Monterey County.

Phases:
None

COMMON NAME	California Bay/Hairy Leaf Ceanothus (Provisional) Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Umbellularia californica-Alnus rhombifolia Woodland/Forest (Provisional) Association

California Bay Woodland/Forest (Provisional) Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1013

Local Description

Summary:
This woodland/forest association occurs on relatively gentle slopes with variable aspect at low elevations between 49 and 347 m. It is dominated by *Umbellularia californica*, *Alnus rhombifolia,* and *Platanus racemosa* in the tree layer and *Baccharis salicifolia* in the understory shrub layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 49–347 m, mean 198 m
Aspect: variable
Slope: range 2–2 degrees, mean 2 degrees
Topography (micro; macro): concave; bottom to lower slopes
Litter Cover: no data
Small Rock Cover: range 30–30%, mean 30%
Large Rock Cover: range 15–15%, mean 15%
Bare Ground: range 5–5%, mean 5%
Parent Material: sedimentary
Soil Texture: muck

Vegetation Description:
Stands of *Umbellularia californica-Alnus rhombifolia* Woodland/Forest form an intermittent tree layer (42–43%, mean 42.5%) with conifers at 0–15 m tall and hardwoods at 10–15 m tall, a sparse shrub layer (9%, mean 9%) at 0.5–5 m tall, and a sparse herbaceous layer (9%, mean 9%) at 0–1 m tall. Total vegetation cover is 63–64%, mean cover is 63.5%.

In this association, the overstory tree layer is dominated by *Umbellularia californica*, *Alnus rhombifolia,* and *Platanus racemosa*. *Salix lasiolepis, Quercus agrifolia,* and *Juglans californica* are frequently in the understory tree layer. The shrub layer is sparse and is dominated by *Baccharis salicifolia*. The herbaceous layer is diverse and is dominated by *Arundo donax, Piptatherum miliaceum,* Algae, *Cyperus* sp., *Foeniculum vulgare*, *Bromus diandrus, Equisetum* sp., and *Typha* sp.

***Umbellularia californica-Alnus rhombifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	100	18.5	15	22	X	X	
	ALRH2-T	*Alnus rhombifolia*	100	11	10	12	X	X	
	PLRA	*Platanus racemosa*	100	5.5	3	8		X	
	PINUS	*Pinus*	50	0.5	1	1			
	EUCAL-T	*Eucalyptus*	50	0.1	0.2	0.2			X
Tree Understory									
	SALA6-T	*Salix lasiolepis*	100	3	3	3	X	X	
	QUAG-M	*Quercus agrifolia*	100	2.5	2	3	X	X	
	JUCA-M	*Juglans californica*	100	1	1	1		X	
	ALRH2-M	*Alnus rhombifolia*	50	1	2	2			
Shrub									
	BASA4	*Baccharis salicifolia*	100	3	2	4	X	X	
	MALA6	*Malosma laurina*	100	2.5	2	3		X	
	NIGL	*Nicotiana glauca*	100	0.6	0.2	1		X	X
	BAPI	*Baccharis pilularis*	50	1	2	2			
	HEAR5	*Heteromeles arbutifolia*	50	1	2	2			
	CESP	*Ceanothus spinosus*	50	0.5	1	1			
	RICO3	*Ricinus communis*	50	0.5	1	1			X
	ACRE9	*Acacia redolens*	50	0.1	0.2	0.2			X
	RHOV	*Rhus ovata*	50	0.1	0.2	0.2			
	SPJU2	*Spartium junceum*	50	0.1	0.2	0.2			X
Herb									
	ARDO4	*Arundo donax*	100	3	2	4		X	X
	PIMI3	*Piptatherum miliaceum*	100	0.6	0.2	1		X	X
	ALGAE	Algae	50	1.5	3	3			
	CYPER	*Cyperus*	50	1.5	3	3			
	FOVU	*Foeniculum vulgare*	50	1.5	3	3			X
	BRDI3	*Bromus diandrus*	50	1	2	2			X
	EQUIS	*Equisetum*	50	1	2	2			
	TYPHA	*Typha*	50	1	2	2			
	CERU2	*Centranthus ruber*	50	0.5	1	1			X
	AGAVE	*Agave*	50	0.1	0.2	0.2			X
	BRNI	*Brassica nigra*	50	0.1	0.2	0.2			X
	MASA2	*Malacothrix saxatilis*	50	0.1	0.2	0.2			
	MEAL2	*Melilotus albus*	50	0.1	0.2	0.2			X
	PESE3	*Pennisetum setaceum*	50	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 2 of 2 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Arundo donax, Nicotiana glauca, Piptatherum miliaceum, Foeniculum vulgare, Bromus diandrus, Centranthus ruber, Ricinus communis, Acacia redolens, Brassica nigra, Melilotus albus, Pennisetum setaceum, Rumex crispus, Spartium junceum

Samples Used in Description: (n = 2)
rap0386, rap0388

Comments:
This is a locally rare provisional association from one main site location, so it will require further sampling to be validated as an association. It is clearly related to the *Alnus rhombifolia-Platanus racemosa* Association in this report. The presence of significant cover of *Umbellularia californica* suggests a narrow, shaded, and rocky riparian setting.

Phases:
None

COMMON NAME	California Bay-White Alder Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This vegetation type may also occur in the south and central coast ranges north of the study area (J. Evens, personal observation). While *Alnus rhombifolia-Platanus racemosa* and *Umbellularia californica-Platanus racemosa* associations are described in this study area, this association is retained because of the strong presence of *Umbellularia californica* with *Alnus rhombifolia*.

References:
None

Umbellularia californica-Juglans californica/Ceanothus spinosus Woodland/Forest Association

California Bay-California Walnut/Greenbark Ceanothus Woodland/Forest Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1011

Local Description

Summary:
This woodland/forest association occurs on moderately steep to steep north-facing slopes at low elevations between 0 and 734 m. It is dominated by *Umbellularia californica* and *Juglans californica* in the tree layer, *Ceanothus spinosus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast region of the study area.

Environmental Description:
Elevation: range 0–734 m, mean 384 m
Aspect: variable but often northeast or northwest
Slope: range 12–40 degrees, mean 26.4 degrees
Topography (micro; macro): variable but often concave; bottom to top slopes
Litter Cover: range 85–85%, mean 85%
Small Rock Cover: range 1–10%, mean 4.5%
Large Rock Cover: range 0–20%, mean 7.3%
Bare Ground: range 1–25%, mean 6.5%
Parent Material: igneous or sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Umbellularia californica-Juglans californica/Ceanothus spinosus* Woodland/Forest form a sparse to intermittent tree layer (8–62%, mean 27.6%) with conifers at 0–10 m tall and hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (1–56%, mean 32.1%) at 0–10 m tall, and a sparse herbaceous layer (0–10%, mean 1.5%) at 0–1 m tall. Total vegetation cover is 35–70%, mean cover is 60.9%.

In this association, the tree layer is dominated by *Umbellularia californica* and *Juglans californica*, and *Quercus agrifolia* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus spinosus*, and *Heteromeles arbutifolia* is often found in lower cover. Occasionally, *Ceanothus megacarpus, Prunus ilicifolia,* and *Toxicodendron diversilobum* are also included. The herbaceous layer is diverse and occasionally includes *Leymus condensatus, Dryopteris arguta,* and *Piptatherum miliaceum* in low cover.

***Umbellularia californica-Juglans californica/Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	95	17.7	5	50	X	X	
	JUCA-T	*Juglans californica*	76	7.2	0.2	30		X	
	QUAG-T	*Quercus agrifolia*	48	1.6	0.2	8			
Shrub									
	CESP	*Ceanothus spinosus*	100	23.9	1	40	X	X	
	HEAR5	*Heteromeles arbutifolia*	76	1.5	0.2	8		X	
	CEME	*Ceanothus megacarpus*	43	0.8	0.2	10			
	PRIL	*Prunus ilicifolia*	43	0.6	0.2	4			
	TODI	*Toxicodendron diversilobum*	33	0.5	0.2	5			
	MALA6	*Malosma laurina*	29	2.1	0.2	31			
	RHOV	*Rhus ovata*	24	0.4	0.2	7			
Herb									
	LECO12	*Leymus condensatus*	29	0.4	0.2	3			

Other Noteworthy Species:
Juglans californica was found in 16 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 1 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Senecio mikanioides, Bromus diandrus, Brassica nigra, Catalpa, Cynodon dactylon, Medicago polymorpha, Nicotiana glauca, Sequoia sempervirens

Samples Used in Description: (n = 21)
AA0477cc, AA0557, AA0854, AA0904, AA0952, AA1040, AA1193, AA1211, rap0126, rap0143, rap0144, rap0146, rap0409, rap0433m, rap0439, rap0449, rap0472m, rap0531, rap0550, rap2160, rap2781

Comments:
This association with *Umbellularia* as a dominant to codominant with *Juglans* is a common semiriparian association occurring on usually steep northerly facing ravines and upper drainages in the Santa Monica Mountains. This association is similar to the *Juglans californica/Ceanothus spinosus* Association, which is especially found on north-facing slopes that are not particularly riparian.

The overstory cover of *Juglans californica* was variable in the stands because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Bay-California Walnut/Greenbark Ceanothus Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Although locally common, this association is largely endemic to the Santa Monica Mountains and surrounding areas.

References:
None

Umbellularia californica-Platanus racemosa Woodland/Forest Association

California Bay-California Sycamore Woodland/Forest Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1014

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects, at low elevations between 183 and 596 m. It is dominated by *Umbellularia californica* and *Platanus racemosa* in the tree layer. *Ceanothus spinosus* is abundant in the understory shrub layer, and a variety of grasses and forbs is in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 183–596 m, mean 418.6 m
Aspect: variable
Slope: range 2–35 degrees, mean 15.7 degrees
Topography (micro; macro): often concave, rarely undulating; bottom to mid slopes
Litter Cover: 60% (one survey)
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: more often sedimentary, occasionally metamorphic or depositional
Soil Texture: medium loam

Vegetation Description:
Stands of *Umbellularia californica-Platanus racemosa* Woodland/Forest form a sparse to continuous tree layer (0–75%, mean 46.6%) with hardwoods at 5–15 m tall, an a sparse to intermittent shrub layer (0–40%, mean 9.5%) at 0–5 m tall, and a sparse herbaceous layer (0–10%, mean 1.6%) at 0–2 m tall. Total vegetation cover is 36–75%, mean cover is 56.7%.

In this association, the tree layer is dominated by *Umbellularia californica* and *Platanus racemosa. Juglans californica* and *Quercus agrifolia* are frequently included in this layer. *Ceanothus spinosus* is abundant in the sparse to intermittent shrub layer. *Heteromeles arbutifolia* is frequently in this layer. Occasionally, *Toxicodendron diversilobum* and *Malosma laurina* are also included. The herbaceous layer is simple and includes *Leymus condensatus* and *Dryopteris arguta*.

***Umbellularia californica-Platanus racemosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	100	36.8	9	70	X	X	
	PLRA	*Platanus racemosa*	100	9.2	2	16		X	
	JUCA-T	*Juglans californica*	70	2.1	0.2	8			
	QUAG-T	*Quercus agrifolia*	50	1.8	2	5			
Shrub									
	CESP	*Ceanothus spinosus*	60	1.7	0.2	12	X		
	HEAR5	*Heteromeles arbutifolia*	60	1.5	0.2	11			
	TODI	*Toxicodendron diversilobum*	30	0.9	0.2	8			
	MALA6	*Malosma laurina*	30	0.1	0.2	0.2			
	PRIL	*Prunus ilicifolia*	20	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	30	0.3	0.2	2			
	DRAR3	*Dryopteris arguta*	30	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 7 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 10 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Stellaria media, Galium aparine, Nicotiana glauca

Samples Used in Description: (n = 10)
AA1221, rap0392, rap1415, rap2386, rap2659, rap2683, rap2684, rap2692, rap2718, rap2783

Comments:
These stands vary from low-lying valleys to steep narrow ravines on upper slopes.

Phases:
None

COMMON NAME	California Bay-California Sycamore Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest

FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur elsewhere in the south and central coast ranges north through Monterey County (T. Keeler-Wolf, personal observation).

References:
None

Shrub Overstory Vegetation Descriptions

Adenostoma fasciculatum Shrubland Association

Chamise Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2011

Local Description

Summary:
This shrubland association occurs on flat to steep slopes of variable aspect at low to middle elevations between 38–862 m. It is dominated by *Adenostoma fasciculatum* in the shrub layer with a diverse but low cover herbaceous layer. There are virtually no emergent trees, but occasionally, *Quercus agrifolia, Umbellularia californica,* and *Platanus racemosa* are present.

Distribution:
This association is sampled in the Upper and Lower Elevation Santa Monica Mountains, Western Fog Zone, Simi Hills Inland, Dry Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 38–862 m, mean 420.2 m
Aspect: variable
Slope: range 0–45 degrees, mean 23.3 degrees
Topography (micro;macro): variable; lower slope to ridge
Litter Cover: range 0–60%, mean 25.2%
Small Rock Cover: range 1–68%, mean 27.3%
Large Rock Cover: range 0–55%, mean 4.8%
Bare Ground: range 0–50%, mean 25.6%
Parent Material: sedimentary or igneous
Soil Texture: coarse loamy sand to fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum* Shrubland form an open to intermittent shrub layer (12–65%, mean 37.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–15%, mean 2.4%) at 0–5 m tall. Trees are occasionally emergent (0–7% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–65%, mean cover is 40.1%.

In this association, the shrub layer is characterized by an abundance of *Adenostoma fasciculatum*. *Salvia mellifera* and *Malosma laurina* are usually included in this layer. The tree layer is emergent and open and may rarely include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Nassella lepida, Centaurea melitensis, Bromus diandrus,* or *Hemizonia fasciculata*.

***Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	28.4	7.5	60.0	X	X	
	SAME3	*Salvia mellifera*	70	2.0	0.2	9.0			
	MALA6	*Malosma laurina*	64	1.0	0.2	6.0			
	YUWH	*Yucca whipplei*	49	0.5	0.2	8.0			
	ERFA2	*Eriogonum fasciculatum*	32	0.3	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	31	0.6	0.2	11.0			
	CEME	*Ceanothus megacarpus*	31	0.4	0.2	6.0			
	LOSC2	*Lotus scoparius*	30	0.2	0.2	3.0			
	ARCA11	*Artemisia californica*	23	0.4	0.2	9.0			
	RHOV	*Rhus ovata*	23	0.2	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	22	0.2	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	21	0.3	0.2	4.0			
Herb									
	BRMAI3	*Bromus madritensis*	27	0.3	0.2	3.0			X

Other Noteworthy Species:
Calochortus plummerae was found in 1 of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Hemizonia minthornii was found in 1of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is ?, and state rank is ? (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Bromus diandrus, Bromus hordeaceus, Brassica nigra, Hirschfeldia incana, Anagallis arvensis, Avena fatua, Erodium cicutarium, Avena, Avena barbata, Carduus pycnocephalus, Lactuca serriola, Medicago polymorpha, Piptatherum miliaceum, Robinia, Schinus molle, Silene gallica

Samples Used in Description: (n = 77)
AA0050cc, AA0191cc, AA0211cc, AA0237cc, AA0259cc, AA0261cc, AA0295cc, AA0485cc, AA0525, AA0561, AA0606, AA0609, AA0724, AA0771, AA0813, AA0824, AA0846, AA0928, AA0943, AA0963, AA1045, AA1050, AA1082, AA1088, AA1156, rap0001, rap0186, rap0193, rap0211, rap0218, rap0219, rap0220, rap0249, rap0258, rap0277, rap0308, rap0310, rap0458, rap0480, rap0481, rap0567, rap0593, rap1207, rap1265, rap1288, rap1305, rap1307, rap1558, rap1586, rap1588, rap1608, rap1613, rap1614, rap1615, rap1658, rap1685, rap1718m, rap1787, rap1788, rap1895, rap1920, rap2089, rap2120, rap2145, rap2284, rap2291, rap2297, rap2322, rap2334, rap2547, rap2548, rap2646, rap2660, rap2691, rap2844, rap2918, rap2927

Comments:
Throughout much of California, there are stands strongly dominated by *Adenostoma fasciculatum* with little else to characterize them. This association is the local SAMO expression of this strongly dominated *A. fasciculatum* vegetation. Clearly, there are some associated species not to be expected in other parts of the state, but none of them occur frequently enough to be

considered characteristic. Thus, this is called the *A. fasciculatum* Shrubland Association although it may be ecologically and biotically somewhat different than other similar associations defined elsewhere in the state.

Phases:
None

COMMON NAME	Chamise Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, several other chamise associations have been defined from California including San Diego County (Evens and San 2005), western Riverside County (Klein, Evens, Keeler-Wolf and Hickson 2005), and mafic soils type from the peninsular ranges (Gordon & White 1994). Several of these may be so similar to be considered synonymous.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The chamise alliance is the most widespread chaparral vegetation in California and ranges from Shasta County in the north to northwestern Baja California, Mexico.

References:
Evens and San 2005, Gordon & White 1994, Klein and Evens 2005

Adenostoma fasciculatum-Ceanothus megacarpus Shrubland Association

Chamise-Big Pod Ceanothus Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2019

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low to mid elevations between 130–810 m. It is dominated by *Adenostoma fasciculatum* in the shrub layer with lower cover of *Ceanothus megacarpus.* It has no significant herbaceous layer. The emergent tree layer is generally nonexistent but may include occasional emergent *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Immediate Coast, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 130–810 m, mean 426.4 m
Aspect: variable
Slope: range 2–35 degrees, mean 23 degrees
Topography (micro; macro): undulating or convex; mid to upper slope
Litter Cover: range 8–50%, mean 23%
Small Rock Cover: range 0–55%, mean 25%
Large Rock Cover: range 0–11%, mean 3.1%
Bare Ground: range 0–58%, mean 30.5%
Parent Material: sedimentary or igneous
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Ceanothus megacarpus* Shrubland form an open to intermittent shrub layer (23–60%, mean 39.1%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–10%, mean 1.2%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 30—60%, mean cover is 40.3%.

In this association, the shrub layer is characterized by abundant *Adenostoma fasciculatum* with *Ceanothus megacarpus, Malosma laurina,* and *Salvia mellifera* also present. *Yucca whipplei* is often present, and *Lotus scoparius* and *Heteromeles arbutifolia* are occasionally included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Nassella lepida, Bromus madritensis,* and *Pellaea mucronata*.

***Adenostoma fasciculatum-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	21.9	8.0	38.0	X	X	
	CEME	*Ceanothus megacarpus*	98	7.9	2.0	18.0		X	
	MALA6	*Malosma laurina*	90	1.8	0.2	8.0		X	
	SAME3	*Salvia mellifera*	81	3.3	0.2	15.0		X	
	YUWH	*Yucca whipplei*	69	0.3	0.2	2.5			
	LOSC2	*Lotus scoparius*	48	0.7	0.2	10.0			
	HEAR5	*Heteromeles arbutifolia*	45	0.4	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	40	0.6	0.2	6.0			
	CEBE3	*Cercocarpus betuloides*	24	0.3	0.2	4.0			
	HASQ2	*Hazardia squarrosa*	21	0.1	0.2	2.0			

Other Noteworthy Species:
Lepechinia fragrans was found in 3 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Bromus hordeaceus, Avena, Bromus diandrus, Anagallis arvensis, Avena fatua, Carduus pycnocephalus, Schinus molle

Samples Used in Description: (n = 42)
AA0024cc, AA0289cc, AA0335, AA0521, AA0668, AA0827, AA0887, AA1039, AA1139, AA1202, rap0005m, rap0020, rap0107, rap0110, rap0131m, rap0141, rap0180, rap0208, rap0286, rap0313, rap0375, rap0414, rap0423m, rap0525, rap0530, rap0544, rap0595, rap0597, rap0799, rap1290, rap1487, rap1702m, rap1735, rap1781, rap2121, rap2243, rap2360, rap2401, rap2474, rap2485, rap2715, rap2788

Comments:
This is an abundant association in the study area and is an interesting one from the standpoint of monitoring. In general, *Ceanothus megacarpus* appears to have become more abundant in the Santa Monica Mountains over the past 60–70 years, while *Adenostoma fasciculatum* has declined (R. Taylor 2004 personal communication). It is in this association of the *Adenostoma fasciculatum* Alliance where one might expect to observe shifts in relative cover and abundance of these two shrubs. Monitoring of several of the 42 samples in these stands through fire events may help clarify the long-term trends of these two common shrub species.

Phases:
None

COMMON NAME	Chamise-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland

ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The inverse of this association, the *Ceanothus megacarpus-Adenostoma fasciculatum/Salvia mellifera* Association, has been described by Borchert et al. (1993). It remains to be seen whether these two associations should be combined.

References:
Borchert et al. 1993

Adenostoma fasciculatum-Eriogonum fasciculatum Shrubland Association

Chamise-California Buckwheat Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2017

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 150–718 m. It is dominated by *Adenostoma fasciculatum* with lower cover of *Eriogonum fasciculatum* in the shrub layer and a low cover of mostly nonnative grasses and forbs in the herbaceous layer. The emergent tree layer is generally nonexistent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 150–718 m, mean 345.5 m
Aspect: variable
Slope: range 4–35 degrees, mean 21.4 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 10–25%, mean 18.3%
Small Rock Cover: range 10–45%, mean 20.7%
Large Rock Cover: range 0–50%, mean 8.1%
Bare Ground: range 10–54%, mean 31.1%
Parent Material: igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Eriogonum fasciculatum* Shrubland form an open to intermittent shrub layer (8–49%, mean 31.1%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–30%, mean 6.7%) at 0–1 m tall. Trees are occasionally emergent (0–1% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 21–51%, mean cover is 36.9%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Eriogonum fasciculatum,* and *Lotus scoparius. Salvia mellifera, Malosma laurina,* and *Yucca whipplei* are usually included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Centaurea melitensis* and *Bromus diandrus.* Other herbs sometimes include *Bromus hordeaceus, Brassica nigra, Bromus madritensis,* and *Chlorogalum pomeridianum*.

***Adenostoma fasciculatum-Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	11.9	2.0	22.0	X		
	ERFA2	*Eriogonum fasciculatum*	94	4.7	1.0	18.0	X		
	LOSC2	*Lotus scoparius*	82	2.9	0.2	13.0	X		
	SAME3	*Salvia mellifera*	65	2.7	1.0	8.0			
	MALA6	*Malosma laurina*	59	0.8	0.2	5.0			
	YUWH	*Yucca whipplei*	53	0.3	0.2	2.5			
	CECR	*Ceanothus crassifolius*	41	0.7	0.2	3.0			
	RHOV	*Rhus ovata*	41	0.4	0.2	3.0			
	DERI	*Dendromecon rigida*	35	1.0	0.2	6.0			
	CESP	*Ceanothus spinosus*	35	0.5	0.2	4.0			
	QUBE5	*Quercus berberidifolia*	29	0.8	0.2	7.0			
	CEBE3	*Cercocarpus betuloides*	29	0.6	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	29	0.4	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	29	0.3	0.2	4.0			
	ARCA11	*Artemisia californica*	29	0.3	0.2	2.5			
	HASQ2	*Hazardia squarrosa*	29	0.2	0.2	2.0			
	CEME	*Ceanothus megacarpus*	24	0.6	2.0	3.0			
	CECU	*Ceanothus cuneatus*	24	0.5	0.2	5.0			
Herb									
	CEME2	*Centaurea melitensis*	65	1.1	0.2	7.5			X
	BRDI3	*Bromus diandrus*	41	1.0	0.2	9.0			X
	BRHO2	*Bromus hordeaceus*	35	1.8	0.2	20.0			X
	BRNI	*Brassica nigra*	29	0.2	0.2	1.0			X
	AVENA	*Avena*	24	0.6	0.2	7.5			X
	BRMA3	*Bromus madritensis*	24	0.3	0.2	2.0			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Bromus diandrus, Bromus hordeaceus, Brassica nigra, Avena, Bromus madritensis, Avena fatua, Avena barbata, Erodium, Lamarckia aurea

Samples Used in Description: (n = 17)
AA0299cc, rap0226m, rap0229, rap0269, rap0368, rap0372, rap0398, rap0455, rap0488, rap0489, rap0490, rap2146, rap2209, rap2353, rap2378, rap2756, rap2768

Comments:
The presence of living or dead *Lotus scoparius* in most of the stands of this association suggests it is a seral association of the *Adenostoma fasciculatum* Alliance. In general, most of these stands appear to have been disturbed by fire within the past 10 years. Over time, these stands may be colonized by *C. crassifolius, C. megacarpus,* or *C. cuneatus* based on location, and the canopy may close, largely excluding *E. fasciculatum*. The two phases identified suggest a more disturbed seral chaparral with annual grasses (perhaps more frequent fires or poor germination of obligate seeding chaparral species) and a phase with better germination of seral fire following shrubs such as *Dendromecon* and *Lotus scoparius*.

Phases:
Adenostoma fasciculatum-Eriogonum fasciculatum/Annual Grass-Herb (Chamise-California Buckwheat/Annual Grass-Herb) Phase [2017]
Adenostoma fasciculatum-Lotus scoparius-Dendromecon rigida (Chamise-Deerweed-Bush Poppy) Phase [7012]

COMMON NAME	Chamise-California Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains region as well as from western Riverside County (Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Stands of this association sampled in western Riverside County also have *Salvia mellifera*, *Arctostaphylos glauca*, *Encelia farinosa,* and *Rhus ovata* in the shrub layer. A similar association, the *Adenostoma fasciculatum-Eriogonum fasciculatum-Salvia apiana* Association, is also known from western Riverside County.

References:
Klein and Evens 2005

Adenostoma fasciculatum-Malosma laurina Shrubland Association

Chamise-Laurel Sumac Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2013

Local Description

Summary:
This shrubland association occurs on moderate to steep slopes of variable aspect at low to mid elevations between 111–991 m. It is dominated by *Adenostoma fasciculatum* and subdominated by *Malosma laurina* in the shrub layer. The herbaceous layer is sparse and composed primarily of introduced annual species. The emergent tree layer includes *Quercus agrifolia* in 20% of the samples.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 111–991 m, mean 445.1 m
Aspect: variable
Slope: range 6–35 degrees, mean 25.3 degrees
Topography (micro; macro): undulating; mid to upper slope
Litter Cover: range 15–25%, mean 17.5%
Small Rock Cover: range 0–75%, mean 18.2%
Large Rock Cover: range 0–90%, mean 14.7%
Bare Ground: range 0–60%, mean 29.3%
Parent Material: sedimentary
Soil Texture: coarse loamy sand to moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Malosma laurina* Shrubland form an open to intermittent shrub layer (8–55%, mean 35.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–9%, mean 1.2%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 8–55%, mean cover is 36.2%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Malosma laurina,* and *Salvia mellifera*. *Yucca whipplei* is often present, and *Eriogonum fasciculatum* is occasionally included in this layer. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Hirschfeldia incana, Centaurea melitensis, Bromus diandrus,* and *Brassica nigra*.

***Adenostoma fasciculatum-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.1	0.2	1.0			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	20	0.1	0.2	2.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	19.1	3.0	37.0	X	X	
	MALA6	*Malosma laurina*	100	8.8	2.0	22.0		X	
	SAME3	*Salvia mellifera*	80	1.9	0.2	5.0		X	
	YUWH	*Yucca whipplei*	72	0.3	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	48	0.8	0.2	6.0			
	LOSC2	*Lotus scoparius*	36	0.3	0.2	2.0			
	CEME	*Ceanothus megacarpus*	32	0.7	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	32	0.3	0.2	3.0			
	RHOV	*Rhus ovata*	28	0.6	0.2	8.0			
	CECR	*Ceanothus crassifolius*	20	0.8	0.2	6.0			
	ERCR2	*Eriodictyon crassifolium*	20	0.2	0.2	2.0			
	ARCA11	*Artemisia californica*	20	0.2	0.2	3.0			
	ARGL3	*Arctostaphylos glandulosa*	20	0.1	0.2	1.0			
Herb									
	BRMA3	*Bromus madritensis*	24	0.01	0.2	0.2			X
	AVENA	*Avena*	20	0.1	0.2	1.0			X

Other Noteworthy Species:
Leptodactylon californicum was found in 2 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Avena, Hirschfeldia incana, Centaurea melitensis, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Pennisetum setaceum, Erodium, Silene gallica

Samples Used in Description: (n = 25)
AA0060cc, AA0691, AA0776, AA0825, AA0877, AA1083, rap0541, rap0600, rap0678, rap1082, rap1119, rap1236, rap1242, rap1572, rap1573, rap1612, rap1616, rap1695m, rap1913, rap2164, rap2239, rap2318m, rap2412, rap2734, rap2846

Comments:
This is a relatively common association in the study area. The presence of *Malosma laurina* with chamise indicates relatively warm and dry conditions. Although *Adenostoma fasciculatum* is typically dominant, averaging about twice the cover of *M. laurina*, occasionally *M. laurina* may codominate.

Phases:
None

COMMON NAME Chamise-Laurel Sumac Shrubland Association
SYNONYM None

PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and western Riverside County. It likely occurs elsewhere in coastal southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association has also been recently described from western Riverside County, where *Ceanothus leucodermis*, *Yucca whipplei*, and *Eriogonum fasciculatum* are also common co-occurring species in the shrub layer.

References:
Klein and Evens 2005

Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium/ Annual Grass-Herb Shrubland Association

Chamise-Laurel Sumac-Yerba Santa Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 7018

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 162–657 m. It is dominated by *Adenostoma fasciculatum* and subdominated by *Malosma laurina* in the shrub layer and scattered native and nonnative species in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in about one-third of the samples.

Distribution:
This association is sampled in the Immediate Coast and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 162–657 m, mean 526 m
Aspect: variable
Slope: range 2–42 degrees, mean 20.3 degrees
Topography (micro; macro): flat, undulating, convex, or concave; lower slope to ridge
Litter Cover: range 7–55%, mean 26.2%
Small Rock Cover: range 2–35%, mean 15%
Large Rock Cover: range 0–60%, mean 17.8%
Bare Ground: range 8–70%, mean 24.9%
Parent Material: sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Malosma laurina-Eriodyction crassifolium/*Annual Grass-Herb Shrubland form an open to intermittent shrub layer (4–42%, mean 21.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (2–32%, mean 13.6%) at 0–1 m tall. Trees are occasionally emergent (0–15% cover, mean 1.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–52%, mean cover is 36.8%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Eriodictyon crassifolium, Malosma laurina,* and *Salvia mellifera*. *Eriogonum fasciculatum, Ceanothus crassifolius,* and *Lotus scoparius* are usually included in this layer. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Bromus madritensis* and *Centaurea melitensis.* Other herbs sometimes include *Bromus diandrus, Filago californica, Hirschfeldia incana,* and *Avena barbata*.

***Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	1.6	2.5	15.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	6.5	2.0	15.0	X		
	MALA6	*Malosma laurina*	88	4.1	2.0	15.0	X		
	ERCR2	*Eriodictyon crassifolium*	88	3.9	2.0	12.0	X		
	SAME3	*Salvia mellifera*	81	1.7	1.0	4.0	X		
	ERFA2	*Eriogonum fasciculatum*	69	0.9	0.2	2.5			
	CECR	*Ceanothus crassifolius*	62	1.3	0.2	7.5			
	LOSC2	*Lotus scoparius*	56	1.9	0.2	15.0			
	MIAU	*Mimulus aurantiacus*	44	0.8	0.2	4.0			
	RIMA	*Ribes malvaceum*	31	0.5	0.2	2.5			
	RHOV	*Rhus ovata*	25	0.6	0.2	5.0			
	HASQ2	*Hazardia squarrosa*	25	0.6	1.0	3.0			
	YUWH	*Yucca whipplei*	25	0.5	0.2	2.5			
	CEBE3	*Cercocarpus betuloides*	25	0.4	1.0	3.0			
	PRIL	*Prunus ilicifolia*	25	0.4	1.0	2.5			
	HEMI6	*Hemizonia minthornii*	25	0.3	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	62	1.1	0.2	3.0			X
	BRMA3	*Bromus madritensis*	62	0.8	0.2	3.0			X
	HIIN3	*Hirschfeldia incana*	56	1.5	0.2	6.0			X
	BRDI3	*Bromus diandrus*	31	1.1	0.2	8.0			X
	FICA2	*Filago californica*	31	0.3	0.2	2.0			
	BRNI	*Brassica nigra*	25	0.8	0.2	7.5			X
	BRHO2	*Bromus hordeaceus*	25	0.8	0.2	7.5			X
	HEFA	*Hemizonia fasciculata*	25	0.7	2.0	3.0			
	AVENA	*Avena*	25	0.6	0.2	7.5			X
	LEFI11	*Lessingia filaginifolia*	25	0.4	0.2	2.5			
	AVBA	*Avena barbata*	25	0.2	0.2	3.0			X
	CUCA	*Cuscuta californica*	25	0.2	0.2	3.0			
	PHACE	*Phacelia*	25	0.1	0.2	1.0			

Other Noteworthy Species:

Hemizonia minthornii was found in 4 of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2 , and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:

Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Bromus diandrus, Brassica nigra, Bromus hordeaceus, Avena, Avena barbata, Erodium cicutarium, Avena fatua, Anagallis arvensis, Vicia villosa, Carduus pycnocephalus, Lamarckia aurea, Nicotiana glauca, Silene gallica

Samples Used in Description: (n = 16)
AA0195cc, AA0196cc, AA0197cc, AA0198cc, AA0264cc, rap1548, rap1603, rap1607, rap1609, rap1610, rap1994, rap2208, rap2372, rap2409, rap2410, rap2411

Comments:
The presence of *Eriodictyon crassifolium* suggests a seral setting in these stands. This is strengthened by the presence of other common short-lived perennial species such as *Lotus scoparius, Hazardia squarrosa*, and numerous annual nonnative species. However, it may persist for longer periods in rocky areas with thin soils. This vegetation type is clearly related to the *Adenostoma fasciculatum-Malosma laurina* Association and may ultimately be considered a broad seral phase of it.

Phases:
None

COMMON NAME	Chamise-Laurel Sumac-Yerba Santa Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Adenostoma fasciculatum-Mimulus aurantiacus Shrubland Association

Chamise-Bush Monkey Flower Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 7013

Local Description

Summary:
This shrubland association occurs on steep to very steep northeast-facing slopes at low elevations between 277–488 m. It is dominated by *Adenostoma fasciculatum* with lesser cover of *Mimulus aurantiacus* in the shrub layer with little distinguishing the herbaceous layer. The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 277–488 m, mean 351.1 m
Aspect: northeast
Slope: range 30–60 degrees, mean 37.1 degrees
Topography (micro; macro): undulating, flat, convex, or concave; lower to ridge top
Litter Cover: range 20–60%, mean 41.7%
Small Rock Cover: range 6–35%, mean 21.5%
Large Rock Cover: range 0–1%, mean 0.5%
Bare Ground: range 20–42%, mean 30.5%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam or sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Mimulus aurantiacus* Shrubland form an intermittent shrub layer (40–48%, mean 43.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–4%, mean 1%) at 0–1 m tall. Trees are occasionally emergent (0–10% cover, mean 1.7%) with hardwoods at 0–10 m tall. Total vegetation cover is 40–52%, mean cover is 46.1%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum* and *Mimulus aurantiacus. Heteromeles arbutifolia, Salvia mellifera,* and *Malosma laurina* are usually included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and occasionally includes *Bromus madritensis.* Other herbs may include *Piptatherum miliaceum, Pentagramma triangularis, Nassella lepida,* and *Marah macrocarpus.*

***Adenostoma fasciculatum-Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	43	1.7	0.2	10.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	18.7	7.0	30.0	X	X	
	MIAU	*Mimulus aurantiacus*	100	9.9	5.0	16.0		X	
	HEAR5	*Heteromeles arbutifolia*	57	5.7	1.0	14.0			
	MALA6	*Malosma laurina*	57	2.2	0.2	6.0			
	SAME3	*Salvia mellifera*	57	0.5	0.2	2.0			
	RHOV	*Rhus ovata*	43	1.3	1.0	6.0			
	KECO	*Keckiella cordifolia*	43	1.2	0.2	7.0			
	ARCA11	*Artemisia californica*	43	0.6	0.2	4.0			
	YUWH	*Yucca whipplei*	29	0.7	2.0	3.0			
	CEBE3	*Cercocarpus betuloides*	29	0.3	0.2	2.0			
	QUBE5	*Quercus berberidifolia*	29	0.3	0.2	2.0			
	SALE3	*Salvia leucophylla*	29	0.3	0.2	2.0			
	CEME	*Ceanothus megacarpus*	29	0.3	1.0	1.0			
	RHIL	*Rhamnus ilicifolia*	29	0.2	0.2	1.0			
	RIMA	*Ribes malvaceum*	29	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	29	0.1	0.2	0.2			
	TODI	*Toxicodendron diversilobum*	29	0.1	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	43	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Bromus madritensis, Bromus hordeaceus, Centaurea melitensis, Piptatherum miliaceum

Samples Used in Description: (n = 7)
rap1912, rap1914, rap2024, rap2071, rap2376, rap2484, rap2827

Comments:
The presence of *Mimulus aurantiacus* as a constant in this association suggests a more coastal or semisheltered setting for this association of the chamise alliance. The *M. aurantiacus* Association of the chamise alliance tends to occur in somewhat rocky, steep areas but typically not as xeric as many other chamise associations. All local aspects are northeast facing, and this association appears to be most common in areas within the summer fog zone.

Phases:
None

COMMON NAME	Chamise-Bush Monkey Flower Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland

PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and from Marin County. Information about its global distribution is not available without additional inventory; however, it likely occurs elsewhere in the coastal mountains of California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
In Marin County (Keeler-Wolf et al. 2003), this association is found on the upper one-third of rocky, 16–30 degree angle, south-facing slopes. Soil textures range from medium loam to moderately coarse sandy loam of sandstone origin. Most stands are above the average summer fog layer.

Vegetation Description:
In Marin County (Keeler-Wolf et al. 2003) stands of the *Adenostoma fasciculatum-Mimulus aurantiacus Shrubland* Association are dominated by *Adenostoma fasciculatum*. *Mimulus aurantiacus covers 1 to 20% of the stand.* Also common in this association are the small nonnative grasses *Aira caryophyllea* and *Gastridium ventricosum.* Other shrubs and understory herbs vary but may include *Melica californica, Hypericum concinnum, Nassella pulchra, Nassella lepida, Avena barbata, Zigadenus fremontii, Chlorogalum pomeridianum, Pleuropogon californicus, Bromus madritensis rubens, Cynosurus echinatus,* and *Baccharis pilularis. Umbellularia californica* may also be present.

Comments:
The association named *Adenostoma fasciculatum-Mimulus aurantiacus* was first described from the outer coast ranges of northern California in Marin County (Keeler-Wolf et al. 2003). Although it differs to some degree in the species composition from the Santa Monica Mountains version, it is essentially similar in that it occurs near or in the coastal fog zone within only one mile or two of the ocean. It stands to reason that the more northerly expression of this association is more restricted to south-facing slopes and in otherwise relatively more xeric settings than the southern California expression where there is less rainfall and warmer temperatures.

References:
Keeler-Wolf et al. 2003

Adenostoma fasciculatum-Salvia leucophylla Shrubland Association

Chamise-Purple Sage (Provisional) Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2018

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes at low elevations between 567 and 631 m. It is codominated by *Adenostoma fasciculatum* and *Salvia leucophylla* in the shrub layer, and a variety of other coastal sage and chaparral shrubs are often present at low cover. The herbaceous layer is variable and may be dominated by grasses or herbs such as *Avena* sp., *Centaurea melitensis,* and/or *Hemizonia fasciculata*. The tree layer is not recorded.

Distribution:
This association is sampled in the Simi Hills Inland region of the study area.

Environmental Description:
Elevation: range 567–631 m, mean 614 m
Aspect: northeast and southwest
Slope: range 15–35 degrees, mean 25.3 degrees
Topography (micro; macro): usually flat, sometimes convex; mid to upper slopes to ridgetop
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: no data
Soil Texture: no data

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia leucophylla* Shrubland form intermittent shrub layer (35–48%, mean 43%). Shrubs commonly occur in two different strata, with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–15%, mean 5.5%) at 0.01–1 m tall. The tree layer is not recorded. Total vegetation cover is 48.–50%, mean cover is 48.5%.

In this association, shrub layer is intermittent and codominated by *Adenostoma fasciculatum* and *Salvia leucophylla*. A variety of other coastal sage and chaparral shrubs is often present at low cover including *Heteromeles arbutifolia*, *Salvia mellifera, Ceanothus crassifolius*, and *Malacothamnus fasciculatus.* The herbaceous layer is variable and may be dominated by *Centaurea melitensis, Avena* sp., and/or *Hemizonia fasciculata*. Other herbs at low cover often include *Marah macrocarpus* and *Leymus condensatus.* The tree layer is absent.

***Adenostoma fasciculatum-Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	17.9	7.5	22.0	X	X	
	SALE3	*Salvia leucophylla*	100	15.0	10.0	20.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	75	2.1	2.0	4.0		X	
	SAME3	*Salvia mellifera*	75	1.9	1.0	4.0		X	
	CECR	*Ceanothus crassifolius*	75	1.4	0.2	3.0		X	
	MAFA	*Malacothamnus fasciculatus*	75	0.9	0.2	2.5		X	
	ARCA11	*Artemisia californica*	50	0.7	0.2	2.5			
	ERFA2	*Eriogonum fasciculatum*	25	0.6	2.5	2.5			
	YUWH	*Yucca whipplei*	25	0.6	2.5	2.5			
	MALA6	*Malosma laurina*	25	0.3	1.0	1.0			
	RHOV	*Rhus ovata*	25	0.3	1.0	1.0			
	BAPI	*Baccharis pilularis*	25	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	25	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	75	0.6	0.2	2.0		X	
	CEME2	*Centaurea melitensis*	50	2.6	3.0	7.5	X		X
	LECO12	*Leymus condensatus*	50	0.6	0.2	2.0			
	AVENA	*Avena*	25	1.9	7.5	7.5			X
	HEFA	*Hemizonia fasciculata*	25	1.9	7.5	7.5			
	ANMU3	*Antirrhinum multiflorum*	25	0.1	0.2	0.2			
	CUCA	*Cuscuta californica*	25	0.1	0.2	0.2			
	HIIN3	*Hirschfeldia incana*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Hirschfeldia incana

Samples Used in Description: (n = 4)
AA0297cc, rap1676, rap1680, rap2038

Comments:
This association has been defined only locally in the study area, where there is a codominance of chamise and purple sage. Currently, the association is provisional since the sample size is low.

Phases:
None

COMMON NAME	Chamise-Purple Sage (Provisional) Shrubland Association
SYNONYM	Coastal Sage-Chaparral Scrub (Holland 1986)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
Holland 1986

Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius Shrubland Association

Chamise-Redshank-Hoary Leaf Ceanothus Shrubland Association
***Adenostoma fasciculatum-Adenostoma sparsifolium* Shrubland Alliance**
Chamise-Redshank Shrubland Alliance

Mapping Code: 2042

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low to mid elevations between 320–888 m. It is dominated by *Adenostoma fasciculatum, Adenostoma sparsifolium, and Ceanothus crassifolius* in the shrub layer with little cover in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 320–888 m, mean 705.8 m
Aspect: variable
Slope: range 2–35 degrees, mean 20.3 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 60–80%, mean 70%
Small Rock Cover: range 5–40%, mean 16%
Large Rock Cover: range 0–5%, mean 1.8%
Bare Ground: range 10–38%, mean 21.7%
Parent Material: igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius* Shrubland form an open to intermittent shrub layer (21–58%, mean 42.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–31%, mean 5.5%) at 0–0.5 m tall. Trees are not present. Total vegetation cover is 42–58%, mean cover is 48%.

In this association, the shrub layer is characterized by *Adenostoma sparsifolium, Ceanothus crassifolius,* and *Adenostoma fasciculatum*. *Yucca whipplei* and *Rhus ovata* are occasionally included in this layer. The tree layer is absent. The herbaceous layer is diverse and may include *Bromus hordeaceus, Centaurea melitensis,* and *Avena* sp.

***Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADSP	*Adenostoma sparsifolium*	100	13.6	2.0	25.0	X	X	
	CECR	*Ceanothus crassifolius*	100	12.8	4.0	25.0		X	
	ADFA	*Adenostoma fasciculatum*	92	9.8	2.0	24.0		X	
	YUWH	*Yucca whipplei*	50	0.4	0.2	2.5			
	RHOV	*Rhus ovata*	42	1.0	0.2	4.0			
	CEOL	*Ceanothus oliganthus*	33	0.8	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	33	0.3	0.2	2.0			
	LEFR	*Lepechinia fragrans*	33	0.2	0.2	1.0			
	SAME3	*Salvia mellifera*	25	0.3	0.2	2.5			
Herb									
	BRHO2	*Bromus hordeaceus*	33	1.1	1.0	10.0			X

Other Noteworthy Species:
Delphinium parryi was found in 1of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 4of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus hordeaceus, Avena, Centaurea melitensis, Avena barbata, Bromus madritensis

Samples Used in Description: (n = 12)
AA0138cc, AA0458cc, rap0785m, rap0795, rap1535m, rap1764, rap1772, rap1782m, rap1784, rap1789, rap2148, rap2171

Comments:
This association is characterized by a codominance of the three nominate species. Although *Ceanothus crassifolius* is a widespread chaparral species forming its own alliance in many parts of southern coastal California, it is not known to occur with redshank in combination with chamise anywhere outside of the Santa Monica Mountains.

Phases:
None

COMMON NAME	Chamise-Redshank-Hoary Leaf Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Adenostoma sparsifolium* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is found in southern coastal California and adjacent Baja California, Mexico (Sawyer and Keeler-Wolf, 1995, Gordon and White (1995).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Gordon and White 1994, Sawyer and Keeler-Wolf 1995

Adenostoma fasciculatum-Arctostaphylos glandulosa Shrubland Association

Chamise-Eastwood Manzanita Shrubland Association
***Adenostoma fasciculatum-Arctostaphylos glandulosa* Shrubland Alliance**
Chamise-Eastwood Manzanita Shrubland Alliance

Mapping Code: 2021

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northeast- and northwest-facing slopes at low to mid elevations between 207–781 m. It is dominated by *Adenostoma fasciculatum* and *Arctostaphylos glandulosa* in the shrub layer and in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 207–781 m, mean 536.9 m
Aspect: northeast and northwest
Slope: range 7–38 degrees, mean 21.9 degrees
Topography (micro; macro): undulating or convex; lower slope to ridgetop
Litter Cover: range 15–35%, mean 25%
Small Rock Cover: range 1–45%, mean 16.3%
Large Rock Cover: range 0–25%, mean 9.1%
Bare Ground: range 5–40%, mean 24.8%
Parent Material: sedimentary or quaternary
Soil Texture: coarse to very fine loamy sand

Vegetation Description:
Stands of *Adenostoma fasciculatum-Arctostaphylos glandulosa* Shrubland form an open to continuous shrub layer (30–70%, mean 49.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–2%, mean 0.1%) at 0–0.5 m tall. Trees are occasionally emergent (0–5% cover, mean 0.7%) with hardwoods at 0–15 m tall. Total vegetation cover is 31–70%, mean cover is 50.3%.

In this association, the shrub layer is characterized by abundant cover of *Adenostoma fasciculatum* and *Arctostaphylos glandulosa*. *Malosma laurina* and *Heteromeles arbutifolia* are usually included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Piptatherum miliaceum, Bromus diandrus, Bromus madritensis,* or *Marah macrocarpus*.

***Adenostoma fasciculatum-Arctostaphylos glandulosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	44	0.5	0.2	2.5			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	23.8	13.0	40.0	X		
	ARGL3	*Arctostaphylos glandulosa*	100	15.2	4.0	28.0	X		
	MALA6	*Malosma laurina*	56	1.3	0.2	9.0			
	HEAR5	*Heteromeles arbutifolia*	56	0.8	0.2	5.0			
	QUBE5	*Quercus berberidifolia*	48	1.9	1.0	9.0			
	CEME	*Ceanothus megacarpus*	44	3.0	1.0	12.0			
	ARGL4	*Arctostaphylos glauca*	40	0.4	0.2	3.0			
	LOSC2	*Lotus scoparius*	36	0.5	0.2	4.0			
	DERI	*Dendromecon rigida*	36	0.4	0.2	2.5			
	CEOL	*Ceanothus oliganthus*	28	0.8	0.2	8.0			
	CEBE3	*Cercocarpus betuloides*	24	0.6	0.2	8.0			
	PIMO5	*Pickeringia montana*	24	0.4	0.2	3.0			
	RHOV	*Rhus ovata*	24	0.2	0.2	2.0			
	SAME3	*Salvia mellifera*	20	0.5	2.0	3.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.3	0.2	2.5			

Other Noteworthy Species:
Lepechinia fragrans was found in 1of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Spartium junceum, Bromus diandrus, Bromus madritensis, Avena, Bromus hordeaceus, Centaurea melitensis, Erodium cicutarium, Hirschfeldia incana

Samples Used in Description: (n = 25)
AA0039cc, AA0049cc, AA0484cc, AA0597, AA0688, AA0879, rap0250, rap0254, rap0259m, rap0266m, rap0267, rap0274m, rap0279m, rap0359, rap0361, rap0363, rap0442, rap0502, rap0504, rap0601, rap1291, rap1682, rap1699, rap2543, rap2786

Comments:
This is an upper elevation chaparral found on the upper slopes of the Santa Monica Mountains and the Simi Hills. It typically occurs on upper ridges and slopes usually above 600 m on northerly facing slopes. In addition to the main manifestation of codominant *A. fasciculatum* and *A. glandulosa*, another phase with a constant presence of *Ceanothus megacarpus* has been identified.

Phases:
Adenostoma fasciculatum-Arctostaphylos glandulosa (Chamise-Eastwood Manzanita) Phase [2021]
Adenostoma fasciculatum-Ceanothus megacarpus-Arctostaphylos glandulosa (Chamise-Big Pod Ceanothus-Eastwood Manzanita) Phase [7017]

COMMON NAME	Chamise-Eastwood Manzanita Shrubland Association
SYNONYM	*Arctostaphylos glandulosa* Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Arctostaphylos glandulosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as several other mountain ranges of southern California including the San Gabriel, San Bernardino, San Jacinto, and peninsular ranges.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The *Adenostoma fasciculatum-Arctostaphylos glandulosa* Association of California is found on north-facing slopes, outcrops, and ridges on shallow soils. Occurrences range in elevation from 300 to 2,200 m. This alliance often follows disturbance, growing on sites that have been burned, logged, or otherwise disturbed.

Vegetation Description:
In western Riverside County, the *Adenostoma fasciculatum-Arctostaphylos glandulosa* Association has *Adenostoma fasciculatum* and *Arctostaphylos glandulosa* consistently present, and both species are usually codominant, though sometimes *Arctostaphylos glandulosa* may be subdominant to *Adenostoma fasciculatum*. Other chaparral shrubs often intermix as subdominants including *Quercus berberidifolia, Heteromeles arbutifolia,* and *Garrya flavescens*.

Comments:
Very similar stands of this association occur throughout many of the mountain ranges of southern coastal California.

References:
Borchert et al. 2004, Gordon and White 1994, Klein and Evens 2005, Reid et al. 1999

Adenostoma fasciculatum-Arctostaphylos glauca Shrubland Association

Chamise-Big Berry Manzanita (Provisional) Shrubland Association
***Adenostoma fasciculatum-Arctostaphylos glauca* Shrubland Alliance**
Chamise-Big Berry Manzanita Shrubland Alliance

Mapping Code: 2531

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 367–664 m. It is dominated by *Adenostoma fasciculatum* and *Arctostaphylos glauca* in the shrub layer with an insignificant herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 367–664 m, mean 445.8 m
Aspect: northeast and northwest
Slope: range 20–35 degrees, mean 29 degrees
Topography (micro; macro): flat, undulating, or concave; mid slope to ridgetop
Litter Cover: range 30–30%, mean 30%
Small Rock Cover: range 2–50%, mean 19.7%
Large Rock Cover: range 0–3%, mean 1%
Bare Ground: range 8–45%, mean 27%
Parent Material: igneous
Soil Texture: coarse loamy sand

Vegetation Description:
Stands of *Adenostoma fasciculatum-Arctostaphylos glauca* Shrubland form an intermittent shrub layer (40–60%, mean 49.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is bare. Trees are not present. Total vegetation cover is 40–60%, mean cover is 49.5%.

In this association, the shrub layer is characterized by *Malosma laurina, Ceanothus megacarpus*, *Adenostoma fasciculatum,* and *Arctostaphylos glauca*. *Salvia mellifera, Cercocarpus betuloides,* and *Heteromeles arbutifolia* are occasionally included in this layer. The tree layer is absent. The herbaceous layer is simple and sometimes contains *Bromus madritensis* and *Centaurea melitensis.*

***Adenostoma fasciculatum-Arctostaphylos glauca* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	22.3	18.0	28.0	X	X	
	ARGL4	*Arctostaphylos glauca*	100	17.8	15.0	20.0	X	X	
	CEME	*Ceanothus megacarpus*	100	7.3	4.0	15.0		X	
	MALA6	*Malosma laurina*	100	0.9	0.2	2.0		X	
	SAME3	*Salvia mellifera*	75	1.5	0.2	5.0		X	
	CEBE3	*Cercocarpus betuloides*	75	0.3	0.2	1.0		X	
	HEAR5	*Heteromeles arbutifolia*	75	0.2	0.2	0.2		X	
	ERFA2	*Eriogonum fasciculatum*	50	0.1	0.2	0.2			
	LOSC2	*Lotus scoparius*	50	0.1	0.2	0.2			
	GAVE2	*Garrya veatchii*	25	0.1	0.2	0.2			
	HASQ2	*Hazardia squarrosa*	25	0.1	0.2	0.2			
	PIMO5	*Pickeringia montana*	25	0.1	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	25	0.1	0.2	0.2			
	RHOV	*Rhus ovata*	25	0.1	0.2	0.2			
	YUWH	*Yucca whipplei*	25	0.1	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	50	0.1	0.2	0.2	X		X
	CEME2	*Centaurea melitensis*	50	0.1	0.2	0.2	X		X
	GALIU	*Galium*	50	0.1	0.2	0.2	X		
Cryptogam									
	LICHEN	*Lichen*	25	0.1	0.2	0.2			
	MOSS	*Moss*	25	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Bromus madritensis, Centaurea melitensis

Samples Used in Description: (n = 4)
rap0378, rap0379, rap0412, rap2921

Comments:
This association occurs locally in the higher and more inland continental portions of the study area. *A. glauca* is a xerophytic manzanita, and it commonly codominates with chamise in many of the hotter, drier chaparral stands throughout central and southern California including the western borders of the Mojave and Sonoran deserts.

Phases:
None

COMMON NAME	Chamise-Big Berry Manzanita Shrubland Association
SYNONYM	*Arctostaphylos glauca* Shrubland Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland

PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Arctostaphylos glauca* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S4

Global Description

Distribution:
This is a common association in the southern and central coastal California area.

Nations:
United States, Mexico (Baja)

States or Provinces:
CA

Environmental Description:
Stands are found at elevations between 300 and 1,000 m. Aspect is more often northerly, less often southerly. Slopes are usually moderate to steep with variable topography. Parent material is varied including granitic metamorphic, sedimentary, and igneous. Soil texture is also varied from sandy loam and sand to clay loam.

Vegetation Description:
In the *Adenostoma fasciculatum-Arctostaphylos glauca* Association, the two species are consistently codominant in the intermittent to dense shrub overstory. A variety of other chaparral species intermixes as subdominants shrubs (e.g., *Garrya flavescens, Keckiella antirrhinoides, Prunus ilicifolia, Heteromeles arbutifolia*).

Comments:
This is a common association in the southern and central coastal California area. It has been reported in San Diego, Riverside, Los Angeles, Santa Barbara, Ventura, San Benito, Monterey, San Luis Obispo, and Fresno counties. Its presence reflects somewhat drier and warmer conditions than the *Adenostoma fasciculatum-Arctostaphylos glandulosa* Association of the *A. fasciculatum–A. glandulosa* Alliance. *Arctostaphylos glauca* is an obligate seeder as opposed to *A. glandulosa*, which is a resprouting species. Similar stands occur as far north as Alameda County in the central coast ranges, though they have not been adequately described (Keeler-Wolf 2005 personal observation).

References:
Evens and San 2005, Evens et al. 2005, Gordon and White 1994, Klein and Evens 2005, Reid 1999, Sawyer and Keeler-Wolf 1995

Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina Shrubland Association

Chamise-Hoary Leaf Ceanothus-Laurel sumac Shrubland Association
***Adenostoma fasciculatum-Ceanothus crassifolius* Shrubland Alliance**
Chamise-Hoary Leaf Ceanothus Shrubland Alliance

Mapping Code: 2572

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low to mid elevations between 17–821 m. It is dominated by both *Adenostoma fasciculatum* and *Ceanothus crassifolius* in the shrub layer, although *C. crassifolius* is typically somewhat higher cover. The herbaceous layer is sparse except for occasional vines of *Marah macrocarpa,* which may sprawl over the shrubs. Trees are generally absent.

Distribution:
This association is sampled in the Simi Hills Inland, Upper Elevation Santa Monica Mountains, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 17–821 m, mean 467.5 m
Aspect: variable
Slope: range 15–35 degrees, mean 27.1 degrees
Topography (micro; macro): undulating, flat, concave, or convex; lower to upper slope
Litter Cover: range 20–85%, mean 37.9%
Small Rock Cover: range 1–40%, mean 13.2%
Large Rock Cover: range 0–15%, mean 1.9%
Bare Ground: range 0–60%, mean 29.4%
Parent Material: predominantly sedimentary, some igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Shrubland form an open to intermittent shrub layer (22–60%, mean 45.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–10 m tall. The herbaceous layer is open (0–13%, mean 2%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–60%, mean cover is 48.3%.

In this association, the shrub layer is characterized by *Ceanothus crassifolius, Adenostoma fasciculatum, Salvia mellifera*, and *Malosma laurina*. *Heteromeles arbutifolia, Rhus ovata,* and *Yucca whipplei* are occasionally included in this layer. The tree layer is emergent and open and may rarely include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Marah macrocarpus, Bromus madritensis, Phacelia cicutaria*, and *Centaurea melitensis.*

***Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CECR	*Ceanothus crassifolius*	100	22.7	7.0	45.0	X	X	
	ADFA	*Adenostoma fasciculatum*	100	13.8	1.0	35.0		X	
	SAME3	*Salvia mellifera*	81	2.9	0.2	15.0		X	
	MALA6	*Malosma laurina*	77	3.5	0.2	12.0		X	
	HEAR5	*Heteromeles arbutifolia*	49	1.0	0.2	10.0			
	RHOV	*Rhus ovata*	49	0.8	0.2	6.0			
	YUWH	*Yucca whipplei*	42	0.3	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	33	0.5	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	21	0.2	0.2	2.5			
Herb									
	MAMA8	*Marah macrocarpus*	21	0.2	0.2	3.0			

Other Noteworthy Species:
Astragalus brauntonii was found in 1 of 43 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 3-3-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Endangered, and state listing is none (SAMO 2004).

Hemizonia minthornii was found in 1of 43 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Avena, Brassica nigra, Bromus diandrus, Hirschfeldia incana, Foeniculum vulgare, Nicotiana glauca, Avena fatua, Bromus hordeaceus, Bromus madritensis subsp. *rubens, Centaurea solstitialis, Marrubium vulgare, Melilotus indicus, Stellaria media*

Samples Used in Description: (n = 43)
AA0029cc, AA0187cc, AA0188cc, AA0192cc, AA0194cc, AA0200cc, AA0296cc, AA0867, AA0939, AA0967, AA1081, AA1104, rap0399, rap0400, rap0492, rap0781, rap1541, rap1542, rap1545m, rap1611, rap1679, rap1681, rap1683, rap1693, rap1698, rap1779, rap1795, rap1796, rap2039m, rap2043, rap2054, rap2091, rap2092, rap2147, rap2149, rap2172, rap2178, rap2179, rap2289, rap2290, rap2333, rap2336, rap2920

Comments:
This association is common in the Simi Hills and at the upper elevation, central portions of the Santa Monica Mountains. The presence of the frost-sensitive *Malosma laurina* in more than 75% of the samples suggests that this is a relatively warm temperate association of the mixed *Adenostoma fasciculatum-Ceanothus crassifolius* Alliance.

Phases:
None

COMMON NAME Chamise-Hoary Leaf Ceanothus-Laurel Sumac Shrubland Association

SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Ceanothus crassifolius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Similar stands occur in western Riverside County (Klein and Evens 2005) and other parts of the peninsular range (Gordon and White 1994); however, they do not have *Malosma laurina* as a constant.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Gordon and White 1994, Klein and Evens 2005

Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina Shrubland Association

Chamise-Wedge Leaf Ceanothus-Black Sage-Laurel Sumac Shrubland Association
***Adenostoma fasciculatum-Ceanothus cuneatus* Shrubland Alliance**
Chamise-Wedge Leaf Ceanothus Shrubland Alliance

Mapping Code: 2511

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep slopes of variable aspect at low elevations between 109–521 m. It is dominated by *Adenostoma fasciculatum* and *Ceanothus cuneatus* with *Salvia mellifera* and *Malosma laurina* as constant subdominants in the shrub layer. It has a low cover of mostly nonnative exotics in the herbaceous layer. The emergent tree layer may include *Quercus agrifolia*.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 109–521 m, mean 306 m
Aspect: variable
Slope: range 9–55 degrees, mean 28.8 degrees
Topography (micro; macro): undulating or convex; lower slope to ridge
Litter Cover: range 15–25%, mean 20%
Small Rock Cover: range 5–40%, mean 22%
Large Rock Cover: range 0–3%, mean 1.6%
Bare Ground: range 15–44%, mean 33.4%
Parent Material: predominantly igneous, some sedimentary
Soil Texture: moderately fine sandy or silty clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (18–52%, mean 40.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–15%, mean 3.4%) at 0–0.5 m tall. Trees are occasionally emergent (0–3% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 22–52%, mean cover is 44%.

In this association, the shrub layer is characterized by *Ceanothus cuneatus, Adenostoma fasciculatum,* and *Eriogonum fasciculatum*. *Salvia mellifera, Malosma laurina, Rhus ovata,* and *Yucca whipplei* are usually included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and occasionally includes *Centaurea melitensis* and *Bromus madritensis.* Other herbs sometimes include *Dudleya pulverulenta, Chlorogalum pomeridianum,* and *Hemizonia fasciculata*.

***Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	25	0.3	0.2	3.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	15.0	2.5	25.0	X	X	
	CECU	*Ceanothus cuneatus*	100	11.2	3.0	18.0		X	
	ERFA2	*Eriogonum fasciculatum*	75	1.7	0.2	8.0		X	
	SAME3	*Salvia mellifera*	67	3.7	1.0	10.0			
	MALA6	*Malosma laurina*	67	1.4	0.2	3.0			
	RHOV	*Rhus ovata*	67	1.2	0.2	7.0			
	YUWH	*Yucca whipplei*	67	0.9	0.2	4.0			
	CEBE3	*Cercocarpus betuloides*	42	0.7	0.2	5.0			
	QUBE5	*Quercus berberidifolia*	33	1.6	2.5	7.0			
	ARCA11	*Artemisia californica*	33	0.5	1.0	2.5			
	LOSC2	*Lotus scoparius*	33	0.1	0.2	1.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.6	1.0	4.0			
Herb									
	CEME2	*Centaurea melitensis*	50	1.3	0.2	7.0	X		X
	AVENA	*Avena*	33	0.8	0.2	4.0			X
	BRMA3	*Bromus madritensis*	25	0.1	0.2	1.0			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Bromus madritensis, Avena fatua, Bromus hordeaceus, Hirschfeldia incana, Bromus diandrus

Samples Used in Description: (n = 12)
AA0124cc, AA0489cc, AA0490cc, AA1106, rap0402, rap0572, rap1628, rap2032, rap2134, rap2136, rap2144, rap2829

Comments:
This association is the only expression of this widespread California alliance locally. It occurs sporadically mostly in the central portion of the Santa Monica Mountains at mid elevations. It remains to be seen how closely related it is to other stands of this alliance reported from other parts of southern California (Gordon and White 1994, Klein and Evens 2005, Borchert et al. 2004).

Phases:
None

COMMON NAME	Chamise-Wedge Leaf Ceanothus-Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland

PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Ceanothus cuneatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Similar stands occur to the north in the Santa Ynez region (Borchert et al. 2004), but those stands have not been differentiated at the association level.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Borchert et al. 2004, Gordon and White 1994, Klein and Evens 2005

Adenostoma fasciculatum-Salvia mellifera Shrubland Association

Chamise-Black Sage Shrubland Association
***Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance**
Chamise-Black Sage Shrubland Alliance

Mapping Code: 2036

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- to northwest-facing slopes at low elevations between 114–510 m. It is dominated by *Adenostoma fasciculatum* and *Salvia mellifera* in the shrub layer with a typically sparse herbaceous layer. The emergent tree layer is typically nonexistent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 114–510 m, mean 297.4 m
Aspect: southeast to northwest
Slope: range 15–42 degrees, mean 27.2 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 18–18%, mean 18%
Small Rock Cover: range 10–30%, mean 20.8%
Large Rock Cover: range 0–10%, mean 3.2%
Bare Ground: range 15–65%, mean 35.8%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera* Shrubland form an open to intermittent shrub layer (20–45%, mean 34.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–15%, mean 4.3%) at 0–1 m tall. Trees are occasionally emergent (0–10% cover, mean 1%) with hardwoods at 0–5 m tall. Total vegetation cover is 31–45%, mean cover is 39.5%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Salvia mellifera,* and *Yucca whipplei. Artemisia californica* is usually present, and *Eriogonum fasciculatum* and *Lotus scoparius* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Nassella lepida* and *Trichostema lanatum*. Other herbs occasionally include *Centaurea melitensis, Bromus diandrus, Calystegia macrostegia, Cuscuta californica, Bromus madritensis,* and *Melica imperfecta*.

***Adenostoma fasciculatum-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	16.6	6.0	30.0	X	X	
	SAME3	*Salvia mellifera*	100	12.0	5.0	23.0	X	X	
	YUWH	*Yucca whipplei*	82	0.7	0.2	2.5		X	
	ARCA11	*Artemisia californica*	55	0.9	0.2	6.0			
	ERFA2	*Eriogonum fasciculatum*	45	0.7	0.2	3.0			
	LOSC2	*Lotus scoparius*	45	0.4	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	27	0.4	0.2	2.0			
	MALA6	*Malosma laurina*	27	0.1	0.2	1.0			
	CEBE3	*Cercocarpus betuloides*	27	0.1	0.2	0.2			
	HASQ2	*Hazardia squarrosa*	27	0.1	0.2	0.2			
Herb									
	NALE2	*Nassella lepida*	27	0.5	0.2	5.0			
	TRLA3	*Trichostema lanatum*	27	0.1	0.2	0.2			

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Avena barbata, Bromus madritensis, Bromus diandrus, Centaurea melitensis, Avena fatua, Schinus molle, Avena, Hirschfeldia incana, Brassica nigra, Bromus hordeaceus, Rosmarinus officinalis, Sonchus oleraceus

Samples Used in Description: (n = 11)
AA0315cc, AA0762, rap0569, rap0588, rap0708, rap1224, rap1778, rap1824, rap1856, rap2119, rap2833

Comments:
Locally this association is often seral showing the evidence of recent fire such as the presence of *Hazardia squarrosa* and *Lotus scoparius.* However, some stands of this association appear to have persisted for much longer periods since the most recent fire event. In general, most of the local stands seem to have a stronger affinity toward coastal scrub species than toward chaparral as indicated by the average constancy of the most common shrub species. This is a transitional association that would be valuable to monitor over the long term to clarify regional trends in scrub dynamics between chaparral and coastal scrub vegetation formations.

Phases:
None

COMMON NAME Chamise-Black Sage Shrubland Association

SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is found in the central coast of California (including Santa Clara County) and in southern California (including inner south coast; western transverse ranges; and Santa Ana, San Jacinto, San Gabriel, and San Bernardino mountains) per Sawyer and Keeler-Wolf (1995).

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands are found at elevations between 100 and 1,000 m on all aspects. Slopes are gentle to steep with variable topography. Parent material is more often granite and less often sedimentary, metamorphic, gabbro, diorite, or metavolcanic. Soil texture varies from sandy loam to silty clay loam.

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera* Shrubland form an open to continuous shrub layer (10–75%, mean 44.2%) where *Adenostoma fasciculatum* usually codominates with *Salvia mellifera*. The shrub layer is often in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to continuous (0.2–75%, mean 22.7%) at 0–1 m tall with a variety of native and nonnative species (see species table). Total vegetation cover is 38–85%, mean cover is 59.2%.

Comments:
This is a widespread association in the central and southern coastal parts of California. It is one of the classic intermixings of chaparral and coastal sage scrub in the California mediterranean climate.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Adenostoma fasciculatum-Salvia mellifera-Malosma laurina Shrubland Association

Chamise-Black Sage-Laurel Sumac Shrubland Association
***Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance**
Chamise-Black Sage Shrubland Alliance

Mapping Code: 2035

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 0–648 m. It is codominated by *Adenostoma fasciculatum* and *Salvia mellifera* in the shrub layer with *Malosma laurina* as a subdominant. It has an insignificant herbaceous layer. The emergent tree layer is usually absent but infrequently includes occasional individuals of *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Simi Hills Inland, Western Fog Zone, Dry Inland, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and the Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–648 m, mean 400 m
Aspect: variable
Slope: range 4–35 degrees, mean 25 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridge
Litter Cover: range 0–45%, mean 19.4%
Small Rock Cover: range 1–60%, mean 27.5%
Large Rock Cover: range 0–15%, mean 3%
Bare Ground: range 0–55%, mean 33.9%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (18–50%, mean 36.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–17%, mean 1.2%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 28–52%, mean cover is 37.9%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Salvia mellifera,* and *Malosma laurina. Yucca whipplei* and *Eriogonum fasciculatum* are usually included in this layer, and *Lotus scoparius* is occasionally present. The tree layer is emergent and open and may rarely include *Quercus agrifolia* and/or *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Centaurea melitensis,* and *Trichostema lanatum*. Other herbs may include *Bromus madritensis* and/or *Galium angustifolium*.

***Adenostoma fasciculatum-Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	16.6	5.0	30.0	X	X	
	SAME3	*Salvia mellifera*	100	10.1	5.0	25.0		X	
	MALA6	*Malosma laurina*	96	4.2	0.2	15.0		X	
	YUWH	*Yucca whipplei*	62	0.8	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	53	0.6	0.2	4.0			
	LOSC2	*Lotus scoparius*	45	0.5	0.2	6.0			
	CEME	*Ceanothus megacarpus*	38	0.8	0.2	5.0			
	CEBE3	*Cercocarpus betuloides*	32	0.2	0.2	2.0			
	RHOV	*Rhus ovata*	30	0.3	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	28	0.3	0.2	4.0			
	ARCA11	*Artemisia californica*	21	0.4	0.2	7.5			
	MAFA	*Malacothamnus fasciculatus*	21	0.2	0.2	3.0			

Other Noteworthy Species:
Juglans californica was found in 2 of 53 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 53 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Avena, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Avena barbata, Erodium, Erodium cicutarium, Lamium amplexicaule, Marrubium vulgare, Melilotus indicus

Samples Used in Description: (n = 53)
AA0161cc, AA0186cc, AA0241cc, AA0357cc, AA0360cc, AA0361cc, AA0367cc, AA0404, AA0486cc, AA0527, AA0564, AA0565, AA0568, AA0646, AA0649, AA0650, AA0652, AA0772, AA0799, AA0874, AA0962, AA0974, AA1070, rap0106, rap0227m, rap0432, rap0457m, rap0493, rap0494, rap0568, rap0570, rap0707, rap0917m, rap1117, rap1238, rap1239, rap1263, rap1284, rap1331, rap1565, rap1566, rap1605, rap1696, rap1769, rap1797, rap1987, rap2010, rap2035, rap2080, rap2137, rap2282, rap2321, rap2859rlv

Comments:
This is a very common and widespread association within the Santa Monica Mountains but is not known elsewhere. The presence of *Malosma laurina* within stands of *A. fasciculatum* and *Salvia mellifera* is apparently largely restricted to the coastal strip of southern California. As with the *A. fasciculatum-S. mellifera* association of the same alliance, this association is often indicative of relatively recent fire.

Phases:
None

COMMON NAME	Chamise-Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Adenostoma fasciculatum-Salvia mellifera-Rhus ovata Shrubland Association

Chamise-Black Sage-Sugar Bush Shrubland Association
***Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance**
Chamise-Black Sage Shrubland Alliance

Mapping Code: 2038

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 17–552 m. It is dominated by *Adenostoma fasciculatum* and *Salvia mellifera* in the shrub layer with *Rhus ovata* as a subdominant. The herbaceous layer is generally poorly developed. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains, Dry Inland and Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 17–552 m, mean 354.5 m
Aspect: variable
Slope: range 15–38 degrees, mean 30.2 degrees
Topography (micro; macro): flat, convex, or undulating; lower slope to ridgetop
Litter Cover: range 15–30%, mean 22.5%
Small Rock Cover: range 5–30%, mean 15%
Large Rock Cover: range 0–2%, mean 0.4%
Bare Ground: range 10–50%, mean 31%
Parent Material: sedimentary, some igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera-Rhus ovata* Shrubland form an open to intermittent shrub layer (32–60%, mean 42.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–3%, mean 0.6%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.2%) with hardwoods at 0–10m tall. Total vegetation cover is 33–62%, mean cover is 43.3%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum*, *Salvia mellifera,* and *Rhus ovata*. *Eriogonum fasciculatum* and *Malacothamnus fasciculatus* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Centaurea melitensis, Cuscuta californica,* and *Trichostema lanatum*.

***Adenostoma fasciculatum-Salvia mellifera-Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	19.7	10.0	28.0	X	X	
	SAME3	*Salvia mellifera*	100	10.5	0.2	25.0		X	
	RHOV	*Rhus ovata*	100	5.5	2.0	15.0		X	
	ERFA2	*Eriogonum fasciculatum*	46	1.7	0.2	9.0			
	MAFA	*Malacothamnus fasciculatus*	42	1.3	0.2	9.0			
	YUWH	*Yucca whipplei*	38	0.4	0.2	2.5			
	MALA6	*Malosma laurina*	33	0.5	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	29	0.7	0.2	7.5			
	CEBE3	*Cercocarpus betuloides*	25	0.4	0.2	2.5			
	SALE3	*Salvia leucophylla*	25	0.4	0.2	5.0			
	CECU	*Ceanothus cuneatus*	21	0.6	0.2	7.5			
	CEME	*Ceanothus megacarpus*	21	0.6	0.2	6.0			
	QUBE5	*Quercus berberidifolia*	21	0.6	1.0	5.0			
	ARCA11	*Artemisia californica*	21	0.4	0.2	7.5			

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Bromus madritensis, Hirschfeldia incana, Brassica nigra, Bromus hordeaceus, Marrubium vulgare

Samples Used in Description: (n = 24)
AA0047cc, AA0092cc, AA0179cc, AA0204cc, AA0236cc, AA0397cc, AA0492cc, AA0581, AA0600, AA0602, AA0604, AA0694, AA0820, AA1182, rap1561, rap1562, rap1793, rap1801, rap1919, rap2003, rap2007, rap2011, rap2025, rap2031

Comments:
This association is the most inland of the three locally represented associations of the *Adenostoma fasciculatum-Salvia mellifera* Alliance. *Rhus ovata* is most commonly found in the hotter and more dry continental climates of southern California; in the local area these stands may be found in areas that experience frequent frost in winter. The hybridization between *Rhus ovata* and *Rhus integrifolia* in the study area makes many individual shrubs in the genus *Rhus* difficult to identify. Occasional hybrids were found in these stands, but most *Rhus* appeared to be more characteristic of *R. ovata.*

Phases:
None

COMMON NAME	Chamise-Black Sage-Sugar Bush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Adenostoma sparsifolium Shrubland Alliance

Redshank Shrubland Alliance

Mapping Code: 2050

Local Description

Summary:
This shrubland alliance occurs on somewhat steep southwest- and southeast-facing slopes at low to mid elevations between 356–844 m. It is dominated by *Adenostoma sparsifolium* in the shrub layer. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 356–844 m, mean 656 m
Aspect: southwest and southeast
Slope: range 15–35 degrees, mean 21.6 degrees
Topography (micro; macro): undulating or concave; lower to upper slope
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: 25%
Bare Ground: no data
Parent Material: igneous
Soil Texture: no data

Vegetation Description:
Stands of this shrubland alliance form an intermittent shrub layer (47–52%, mean 49.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is bare (0%). Trees are occasionally emergent (0–0.2% cover, mean 0.1%) with hardwoods at 0–5 m tall. Total vegetation cover is 47–52%, mean cover is 49.3%.

In this association, the shrub layer is characterized by *Adenostoma sparsifolium, Rhus ovata, Ceanothus spinosus,* and *Malosma laurina*. *Heteromeles arbutifolia, Salvia mellifera*, *Ceanothus megacarpus,* and *Adenostoma fasciculatum* are often included in this layer. Occasional, small trees are emergent and may include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus* and *Bromus* sp.

Adenostoma sparsifolium Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	QUAG-M	*Quercus agrifolia*	33	0.1	0.2	0.2			
Shrub									
	ADSP	*Adenostoma sparsifolium*	100	18.3	7.0	25.0	X	X	
	CESP	*Ceanothus spinosus*	100	13.7	4.0	23.0	X	X	
	MALA6	*Malosma laurina*	100	3.0	3.0	3.0		X	
	RHOV	*Rhus ovata*	100	0.8	0.2	2.0		X	
	CEME	*Ceanothus megacarpus*	67	4.3	5.0	8.0			
	ADFA	*Adenostoma fasciculatum*	67	1.4	0.2	4.0			
	SAME3	*Salvia mellifera*	67	1.1	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	67	0.1	0.2	0.2			
	HEAR5	*Heteromeles arbutifolia*	67	0.1	0.2	0.2			
	MAFA	*Malacothamnus fasciculatus*	33	0.3	1.0	1.0			
	ARCA11	*Artemisia californica*	33	0.1	0.2	0.2			
	ERCO25	*Eriophyllum confertiflorum*	33	0.1	0.2	0.2			
	LEFR	*Lepechinia fragrans*	33	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	33	0.1	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	33	0.1	0.2	0.2			
Herb									
	BROMU	*Bromus*	33	0.1	0.2	0.2			
	LECO12	*Leymus condensatus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Lepechinia fragrans was found in 1of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 3)
rap0527m, rap2496, rap2928

Comments:
Most stands with significant *A. sparsifolium* in the Santa Monica Mountains are considered part of the *A. sparsifolium-Adenostoma fasciculatum* Alliance. The three relatively pure stands represented in this alliance level description all have relatively high cover of *Ceanothus spinosus* and with further verification may be considered to be an *A. sparsifolium-C. spinosus* Association. Such stands are apparently rare in the study area and are not likely to be found outside of the study area.

Phases:
None

COMMON NAME Redshank Alliance
SYNONYM Ribbonwood or Chamise-Redshank Community
PHYSIOGNOMIC CLASS III. Shrubland

PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.C. Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma sparsifolium* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance occurs from California's central coast, south into the cismontane transverse and peninsular ranges, extending into northern Baja California, Mexico.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
The *Adenostoma sparsifolium* Shrubland Alliance grows on dry slopes and flats with deep soils derived from alluvium or bedrock. Stands occur from 300 to 2,000 m in elevation. This alliance is adapted to slightly cooler temperatures and drier conditions than other widespread chaparral vegetation types. Summers are dry and winters are relatively cool and moist. This alliance often occurs in a mosaic with the *Adenostoma fasciculatum* Shrubland Alliance. Keeler-Wolf et al. (1998) show an *Adenostoma sparsiflorum* Alliance and the closely related *Adenostoma fasciculatum-Adenostoma sparsiflorum* Alliance as occurring adjacent to desert vegetation types along much of the northwestern portion of Anza-Borrego Desert State Park.

Vegetation Description:
This shrubland of California and Baja California is dominated by *Adenostoma sparsifolium* that may be the sole shrub in the canopy. Other shrubs may include *Cercocarpus montanus* var. *glaber, Adenostoma fasciculatum, Ceanothus greggii, Rhamnus ilicifolia, Quercus cornelius-mulleri*, and *Garrya veatchii*. The herbaceous layer is sparse.

Comments:
In a study of the range of *Adenostoma sparsifolium,* Marion (1943) found monotypic stands of redshank in just 3% of its distribution; more often it intermixes with chamise.

References:
Keeler-Wolf et al. 1998, Marion 1943, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Arctostaphylos glandulosa Shrubland Alliance

Eastwood Manzanita Shrubland Alliance

Mapping Code: 2550

Local Description

Summary:
This shrubland alliance occurs on somewhat steep to steep northwest-facing slopes at low to middle to high elevations between 557–878 m. It is dominated by *Arctostaphylos glandulosa* in the shrub layer and has an insignificant herbaceous layer in the mature stands. The emergent tree layer includes *Quercus agrifolia* in about one-third of the stand sampled.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 557–878 m, mean 755 m
Aspect: northwest
Slope: range 20–35 degrees, mean 27.6 degrees
Topography (micro; macro): undulating or concave; middle slope to ridge
Litter Cover: 75%
Small Rock Cover: range 5–13%, mean 9%
Large Rock Cover: range 3–15%, mean 9%
Bare Ground: range 2–10%, mean 6%
Parent Material: igneous or metamorphic
Soil Texture: medium to very fine loamy sand

Vegetation Description:
Stands of this shrubland alliance form an intermittent shrub layer (38–65%, mean 54.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is bare (<1%). Occasionally emergent trees are present (0–0.2% cover, mean 0.1%) with hardwoods from 0–10 m tall. Total vegetation cover is 38–65%, mean cover is 54.3%.

In this association, the shrub layer is dominated by *Arctostaphylos glandulosa*. *Heteromeles arbutifolia* and *Adenostoma fasciculatum* are also usually present but at much lower cover values. Other shrubs occasionally present include *Helianthemum scoparium, Ceanothus crassifolius, Lepechinia fragrans, Ceanothus oliganthus, Adenostoma sparsifolium, Quercus berberidifolia,* and *Ceanothus megacarpus. The* tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus* and *Zigadenus fremontii*.

Arctostaphylos glandulosa Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	0.1	0.2	0.2			
Shrub									
	ARGL3	*Arctostaphylos glandulosa*	100	33.7	23.0	50.0	X	X	
	ADFA	*Adenostoma fasciculatum*	100	2.7	1.0	4.0		X	
	HEAR5	*Heteromeles arbutifolia*	100	0.7	0.2	1.0		X	
	ADSP	*Adenostoma sparsifolium*	67	9.0	5.0	22.0			
	CEME	*Ceanothus megacarpus*	67	4.0	2.0	10.0			
	CEOL	*Ceanothus oliganthus*	67	2.0	3.0	3.0			
	LEFR	*Lepechinia fragrans*	67	1.3	2.0	2.0			
	CECR	*Ceanothus crassifolius*	67	0.4	0.2	1.0			
	HESC2	*Helianthemum scoparium*	67	0.4	0.2	1.0			
	QUBE5	*Quercus berberidifolia*	67	0.4	0.2	1.0			
	LECA7	*Leptodactylon californicum*	33	0.1	0.2	0.2			
	RHOV	*Rhus ovata*	33	0.1	0.2	0.2			
	RIMA	*Ribes malvaceum*	33	0.1	0.2	0.2			
	SAME3	*Salvia mellifera*	33	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	33	0.1	0.2	0.2			
	ZIFR	*Zigadenus fremontii*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Lepechinia fragrans was found in 2 of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 3)
rap0235, rap0790m, rap1533

Comments:
This alliance is only found at the upper elevations of the study area. It is much more widespread in the higher mountains of the transverse and peninsular ranges of southern California.

Phases:
None

COMMON NAME Eastwood Manzanita Alliance
SYNONYM Montane Manzanita Chaparral (Holland 1986)
PHYSIOGNOMIC CLASS III. Shrubland

PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.c. Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Arctostaphylos glandulosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance is found along California's outer north coast, outer central coast, and along the montane transverse and peninsular ranges. It may also occur in the northern portion of Baja California, Mexico.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
The *Arctostaphylos glandulosa* Shrubland Alliance of California is found on north-facing slopes, outcrops, and ridges on shallow soils. Occurrences range in elevation from 300 to 2,200 m. This alliance often follows disturbance, growing on sites that have been burned, logged, or otherwise disturbed.

Vegetation Description:
This shrubland is characterized by a continuous canopy of sclerophyllous broad-leaved, evergreen shrubs less than 3 m in height. Emergent conifers may be present. The herbaceous layer is sparse or absent. *Arctostaphylos glandulosa* dominates this alliance. Six subspecies of *Arctostaphylos glandulosa* are recognized by the Jepson Manual (Hickman 1993), any of which may occur in this alliance. Other shrubs present often include *Arctostaphylos glauca, Adenostoma fasciculatum, Ceanothus leucodermis, Yucca whipplei, Baccharis pilularis, Quercus wislizeni, Quercus dumosa, Rhus ovata*, and *Heteromeles arbutifolia*. Emergent *Pinus coulteri* may be present.

Comments:
There are several subspecies of *A. glandulosa.* Most of them are montane and typically occur above 600 m elevation. All are resprouters with lignotubers.

References:
Hickman 1993, Holland 1986, Sawyer and Keeler-Wolf 1995

Arctostaphylos glauca Shrubland Alliance

Big Berry Manzanita Shrubland Alliance

Mapping Code: 2540

Local Description

Summary:
This shrubland alliance occurs on somewhat steep northwest-facing slopes at low elevation (382 m). It is solely dominated by *Arctostaphylos glauca* in the shrub layer. No species were recorded for the herbaceous and tree layers.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: 382 m
Aspect: northwest
Slope: 15 degrees
Topography (micro; macro): flat; mid to upper slopes
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: igneous
Soil Texture: no data

Vegetation Description:
One stand of *Arctostaphylos glauca* Shrubland forms an intermittent shrub layer (55%). Shrubs occur in two different strata with low shrubs at 0.5–1 m tall and tall shrubs at 1–2 m tall. The herbaceous layer and emergent tree layer were not recorded for this stand. Total vegetation cover is 55%.

In this alliance, the shrub layer is intermittent and was solely dominated by *Arctostaphylos glauca*. *Adenostoma fasciculatum* occurred at low cover as did *Malosma laurina*. No species were recorded for the tree layer or herbaceous layer.

Arctostaphylos glauca Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARGL4	*Arctostaphylos glauca*	100	48.0	48.0	48.0	X	X	
	ADFA	*Adenostoma fasciculatum*	100	5.0	5.0	5.0		X	
	MALA6	*Malosma laurina*	100	2.0	2.0	2.0		X	

Other Noteworthy Species:
None

Nonnative Species:
None

Samples Used in Description: (n = 1)
rap0411

Comments:
The one stand was assessed at a distance. Big berry manzanita stands are not common but local in the Simi Hills portion of the study area on northerly slopes.

Phases:
None

COMMON NAME	Big Berry Manzanita Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.c. Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Arctostaphylos glauca* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance is known to occur in the central coast (including Santa Clara County south to Santa Barbara County), inner south coast, and montane transverse and peninsular ranges (including from southern San Bernardino Mountains, San Jacinto Mountains, and San Diego County western foothills) to Baja California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands occur on moderate to steep slopes that are typically granitic or metamorphic parent material, though some are found on serpentine. Soils usually have a sandy loam or loam texture, most often shallow to moderately deep.

Vegetation Description:
Arctostaphylos glauca is primarily the dominant shrub in the overstory. *Adenostoma fasciculatum* is often present in relatively low cover. The herbaceous layer may be sparse to well developed including a variety of native species including *Camissonia* spp., *Galium* spp., *Marah macrocarpus, Melica* spp., and *Phacelia* spp.

Comments:
None

References:
Borchert et al. 2004, Evens et al. 2005, Evens and San 2004, Gordon and White 1994, Keeler-Wolf 1990, Sawyer and Keeler-Wolf 1995

Artemisia californica Shrubland Association

California Sagebrush Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 8213

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 0–609 m. It is characterized by a dominance of *Artemisia californica* in the shrub layer, and a scattered, mostly nonnative herbaceous layer. The emergent tree layer infrequently includes *Quercus agrifolia, Juglans californica,* and *Schinus molle*.

Distribution:
This association is sampled in the Simi Hills Inland, Immediate Coast, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Dry Inland Upper Elevation Santa Monica Mountains, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–609 m, mean 247.4 m
Aspect: variable
Slope: range 1–45 degrees, mean 21.5 degrees
Topography (micro; macro): convex, undulating, or flat; lower slope to ridgetop
Litter Cover: range 2–80%, mean 33.7%
Small Rock Cover: range 0–55%, mean 16.5%
Large Rock Cover: range 0–20%, mean 1.7%
Bare Ground: range 10–98%, mean 40%
Parent Material: sedimentary or igneous, occasional quaternary alluvium
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica* Shrubland form an open to intermittent shrub layer (5–49%, mean 29%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–51%, mean 7.9%) at 0–2 m tall. Trees are occasionally emergent (0–8% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 14–65%, mean cover is 37.2%.

In this association, the shrub layer is characterized by *Artemisia californica. Malosma laurina* and *Salvia leucophylla* are usually present. *Baccharis pilularis* and *Salvia mellifera* are occasionally included in the shrub layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia, Juglans californica,* or *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Leymus condensatus,* and *Bromus diandrus.*

***Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	20.2	2.5	40.0	X		
	MALA6	*Malosma laurina*	61	2.0	0.2	15.0			
	SALE3	*Salvia leucophylla*	48	1.3	0.2	15.0			
	BAPI	*Baccharis pilularis*	45	0.6	0.2	7.5			
	SAME3	*Salvia mellifera*	35	0.7	0.2	8.0			
	LOSC2	*Lotus scoparius*	29	0.4	0.2	4.0			
	MIAU	*Mimulus aurantiacus*	24	0.3	0.2	9.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.3	0.2	3.0			
	SAME5	*Sambucus mexicana*	21	0.1	0.2	5.0			
	ERCI5	*Eriogonum cinereum*	20	0.5	0.2	6.0			
	YUWH	*Yucca whipplei*	20	0.2	0.2	7.0			
Herb									
	BRMA3	*Bromus madritensis*	36	0.7	0.2	8.0			X
	BRNI	*Brassica nigra*	30	0.8	0.2	15.0			X
	CEME2	*Centaurea melitensis*	30	0.7	0.2	12.0			X
	HIIN3	*Hirschfeldia incana*	29	0.7	0.2	10.0			X
	LECO12	*Leymus condensatus*	21	0.3	0.2	5.0			
	BRDI3	*Bromus diandrus*	20	0.3	0.2	8.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 100 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 6 of 100 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Carduus pycnocephalus, Avena, Avena fatua, Foeniculum vulgare, Erodium, Erodium cicutarium, Marrubium vulgare, Nicotiana glauca, Ricinus communis, Conyza canadensis, Lactuca serriola, Melilotus indicus, Pennisetum setaceum, Euphorbia terracina, Anagallis arvensis, Cirsium vulgare, Schinus molle, Avena barbata, Conium maculatum, Phalaris aquatica, Salsola tragus, Lamarckia aurea, Senecio vulgaris, Vicia villosa, Eucalyptus, Brassica, Centaurea solstitialis, Robinia, Schinus molle, Silene gallica, Chenopodium album, Erodium botrys, Eucalyptus, Medicago polymorpha, Piptatherum miliaceum, Raphanus sativus, Rumex crispus, Sonchus, Sonchus oleraceus, Xanthium spinosum

Samples Used in Description: (n = 100)
AA0002cc, AA0262cc, AA0281cc, AA0282cc, AA0362cc, AA0365cc, AA0498, AA0510, AA0514, AA0515, AA0534, AA0567, AA0572, AA0587, AA0592, AA0616, AA0676, AA0680, AA0748cc, AA0759, AA0768, AA0769cc, AA0826, AA0853, AA0863, AA0871, AA0883, AA0909, AA0934, AA0958, AA1003, AA1043, AA1128, rap0041, rap0119m, rap0175, rap0652, rap0654, rap0803, rap0805, rap0848, rap0931, rap0949, rap0959, rap1016, rap1092, rap1112m, rap1147, rap1168,

rap1169, rap1170, rap1176m, rap1210, rap1258, rap1261, rap1423, rap1424, rap1429, rap1540, rap1732, rap1748, rap1754m, rap1817, rap1870, rap1900, rap1937, rap1938, rap1968, rap1969, rap1970, rap1972, rap1973, rap1975, rap1979, rap1982m, rap2016, rap2036, rap2050, rap2077, rap2107, rap2202, rap2246, rap2252, rap2281, rap2283, rap2366, rap2420, rap2455rlv, rap2473rlv, rap2482, rap2507, rap2518rlv, rap2669, rap2724, rap2742, rap2785, rap2820, rap2821, rap2850rlv, rap2932

Comments:
This is an abundant association in the SAMO study area. All stands are strongly dominated by *A. californica*. Many stands have low cover of *Baccharis pilularis,* and a smaller number of stands have *Lotus scoparius.* Both species are generally considered seral in the area, suggesting this association is also reflective of somewhat recent disturbance. This is also underscored by a low cover of several nonnative annual grasses and herbs in many of the plots. The phase with annual grass-herb understory suggests a degraded version or a postfire setting (see below).

Phases:
Artemisia californica-Malosma laurina (California Sagebrush-Laurel Sumac) Phase [3219]
Artemisia californica-Salvia leucophylla (California Sagebrush-Purple Sage) Phase [3211]
Artemisia californica/Annual Grass-Herb (California Sagebrush/Annual Grass-Herb) Phase [8213]

COMMON NAME	California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and San Diego County (Evens and San 2005). It is likely to occur in many other parts of California from the central coast ranges south to at least the Mexican border.

Nations:
United States

States or Provinces:
CA

Environmental Description: (Additional Information from Evens and San [2005])
Elevation: below 700 m
Aspect: mostly southwest, but occasionally northeast and rarely northwest

Slope: gentle to steep, mostly moderate
Topography: undulating, concave, flat, and convex; lower slope to ridgetop
Litter Cover: range 11.7–95%, mean 58.6%
Rock Cover: range 1.2–18%, mean 8.8%
Bare Ground: range 12–65%, mean 38%
Parent Material: often mesozoic granite, occasionally sandstone
Soil Texture: more often medium to very fine sandy loam; occasionally moderately fine sandy clay loam, moderately fine clay loam, medium sand, or fine sandy clay

Vegetation Description:
In the *Artemisia californica* Association, *Artemisia californica* is the sole dominant shrub in the understory, while herbaceous species may be abundant in the understory including *Nassella lepida, Bromus madritensis,* and *Centaurea melitensis.* Shrub species *Malosma laurina* and *Eriogonum fasciculatum* are often present but in relatively low cover.

Comments:
Although not described as an association beyond this study and the study of the San Dieguito River drainage by Evens and San (2005), this is likely to be a common association throughout much of the range of the *Artemisia californica* Alliance. Borchert et al. (2004) describe strongly dominated *A. californica* stands from the Los Padres National Forest of Monterey County south to Ventura County. Gordon and White (1994) describe this alliance in a similar setting to Borchert et al. White and Padley (1997) describe a California sagebrush series (alliance) in Riverside County that has a mean elevation of 1,350 ft.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, White and Padley 1997

Artemisia californica/Leymus condensatus Shrubland Association

California Sagebrush/Giant Wild Rye Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 3216

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 38–432 m. It is characterized by *Artemisia californica* in the shrub layer and *Leymus condensatus* in the herbaceous layer. The emergent tree layer is usually absent but may include *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Dry Inland, Simi Hills Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 38–432 m, mean 272.5 m
Aspect: variable
Slope: range 2–35 degrees, mean 28.3 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 30–75%, mean 52.5%
Small Rock Cover: range 3–5%, mean 4.5%
Large Rock Cover: range 0–7%, mean 1.8%
Bare Ground: range 7–60%, mean 26%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Artemisia californica/Leymus condensatus* Shrubland form an open to intermittent shrub layer (14–52%, mean 29.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (2–39%, mean 16.2%) at 0.1–2 m tall. Trees are occasionally emergent (0–5% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–60%, mean cover is 47%.

In this association, the shrub layer is characterized by *Artemisia californica. Salvia leucophylla, Toxicodendron diversilobum,* and *Mimulus aurantiacus* are usually included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and is characterized by *Leymus condensatus.* Other herbs sometimes include *Brassica nigra, Malacothrix saxatilis, Bromus diandrus, Hirschfeldia incana,* and *Melica imperfecta*.

***Artemisia californica/Leymus condensatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	16.3	7.0	30.0	X	X	
	SALE3	*Salvia leucophylla*	67	2.3	0.2	8.0			
	TODI	*Toxicodendron diversilobum*	61	3.4	0.2	14.0			
	MIAU	*Mimulus aurantiacus*	50	1.5	0.2	13.0			
	MAFA	*Malacothamnus fasciculatus*	39	0.4	0.2	2.5			
	HEAR5	*Heteromeles arbutifolia*	33	0.3	0.2	2.5			
	MALA6	*Malosma laurina*	28	1.1	1.0	9.0			
	SAME5	*Sambucus mexicana*	28	0.8	0.2	5.0			
	CEME	*Ceanothus megacarpus*	22	0.4	0.2	4.0			
	RHOV	*Rhus ovata*	22	0.3	0.2	2.5			
	BAPI	*Baccharis pilularis*	22	0.2	0.2	3.0			
	RHIN2	*Rhus integrifolia*	22	0.2	0.2	2.0			
	SAME3	*Salvia mellifera*	22	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	100	9.8	2.0	25.0	X	X	
	UNGR	Unknown annual grass	22	3.0	2.0	25.0			
	POACXX	Poaceae	22	1.2	0.2	19.0			
	BRNI	*Brassica nigra*	22	0.3	0.2	4.0			X
	MASA2	*Malacothrix saxatilis*	22	0.01	0.2	0.2			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 1of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 3 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Samples Used in Description: (n = 18)
AA0001cc, AA0320cc, AA0627, AA0736, rap0030, rap0810, rap0850, rap0851, rap1008, rap1009, rap1812, rap1887, rap1965, rap1967, rap1981, rap2220, rap2223, rap2227

Comments:
This association of the *A. californica* Alliance is characterized by a codominance of California sagebrush and giant wild rye. This condition tends to develop as a result of fire on relatively mesic slopes that may have formerly contained a mixture of *A. californica* with other species prior to the fire. Both *Leymus condensatus* and *Malacothamnus fasciculatus* (found in about 40% of the plots) tend to increase in cover following recent fire. However, the association may be more persistent in areas with seasonal seeps or natural ground disturbance.

Phases:
None

COMMON NAME	California Sagebrush/Giant Wild Rye Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Artemisia californica-Eriogonum cinereum Shrubland Association

California Sagebrush-Ashy Buckwheat Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 3214

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep slopes of variable aspect at low elevations between 0–460 m. It is characterized by *Artemisia californica* and *Eriogonum cinereum* in the shrub layer. The herbaceous layer is generally insignificant but does include several native species of grasses. The emergent tree layer is generally absent but may include *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Dry Inland Simi Hills, Inland Upper Elevation Santa Monica Mountains, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–460, mean 177 m
Aspect: variable but most often southwest or southeast
Slope: range 6–50 degrees, mean 30.7 degrees
Topography (micro; macro): flat or convex; lower slope to ridgetop
Litter Cover: range 15–45%, mean 21.8%
Small Rock Cover: range 0–60%, mean 21%
Large Rock Cover: range 0–15%, mean 2.8%
Bare Ground: range 0–80%, mean 35%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (12–48%, mean 31.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–30%, mean 6%) at 0–1 m tall. Trees are occasionally emergent (0–10% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 12–51%, mean cover is 36.9%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Eriogonum cinereum. Malosma laurina, Yucca whipplei,* and *Salvia mellifera* are usually included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Melica imperfecta,* and *Bromus madritensis.*

***Artemisia californica-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	99	10.2	3.0	22.0		X	
	ERCI5	*Eriogonum cinereum*	97	7.9	0.2	17.0		X	
	MALA6	*Malosma laurina*	75	2.2	0.2	15.0			
	YUWH	*Yucca whipplei*	71	1.5	0.2	12.0			
	SAME3	*Salvia mellifera*	70	3.7	0.2	15.0			
	LOSC2	*Lotus scoparius*	46	0.5	0.2	4.0			
	SALE3	*Salvia leucophylla*	41	0.7	0.2	5.0			
	RHIN2	*Rhus integrifolia*	41	0.6	0.2	7.5			
	ENCA	*Encelia californica*	39	0.6	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	38	1.3	0.2	12.0			
	HASQ2	*Hazardia squarrosa*	32	0.5	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	28	0.5	0.2	6.0			
	ERFA2	*Eriogonum fasciculatum*	22	0.3	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	30	0.3	0.2	2.5			
	MEIM	*Melica imperfecta*	29	2.2	1.0	20.0			
	BRMA3	*Bromus madritensis*	25	0.4	0.2	12.0			X
	NASSE	*Nassella*	23	0.7	0.2	8.0			

Other Noteworthy Species:
Calochortus catalinae was found in 2 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Brassica nigra, Avena, Bromus diandrus, Foeniculum vulgare, Hirschfeldia incana, Bromus hordeaceus, Erodium, Avena barbata, Erodium cicutarium, Medicago polymorpha, Sonchus oleraceus, Eucalyptus, Carpobrotus edulis, Anagallis arvensis, Avena fatua, Cirsium vulgare, Lolium, Nicotiana glauca, Vicia villosa

Samples Used in Description: (n = 79)
AA0009cc, AA0068cc, AA0070cc, AA0074cc, AA0077cc, AA0078cc, AA0079cc, AA0080cc, AA0116cc, AA0134cc, AA0178cc, AA0180cc, AA0406, AA0407, AA0449cc, AA0478cc, AA0516, AA0549, AA0623, AA0664, AA0666, AA0720, AA0780, AA0823, AA0866, AA0998, AA1024, AA1069, rap0046, rap0047m, rap0048, rap0049, rap0050, rap0051, rap0070, rap0094, rap0096, rap0097, rap0114m, rap0165, rap0509m, rap0680, rap0686, rap0845, rap0847, rap0916, rap0976, rap0982, rap1029, rap1033m, rap1053m, rap1054, rap1059, rap1060, rap1068, rap1099, rap1102, rap1161, rap1205, rap1509, rap1539, rap1675, rap1815, rap2112, rap2180, rap2269, rap2327, rap2374, rap2517rlv, rap2546, rap2560rlv, rap2566, rap2594, rap2622, rap2661, rap2662, rap2754, rap2793, rap2904rlv

Comments:
This is a very common and largely endemic association to the more coastal portions of the Santa Monica Mountains. It occupies relatively steep slopes usually on southerly facing exposures. Two minor phases of this association have been identified. The one with *Melica imperfecta* may indicate slightly more mesic conditions.

Phases:
Artemisia californica-Eriogonum cinereum (California Sagebrush-Ashy Buckwheat-Black Sage) Phase [3214]
Artemisia californica-Eriogonum cinereum-Mimulus aurantiacus/Melica imperfecta (California Sagebrush-Ashy Buckwheat-Bush Monkey Flower) Phase [3218]

COMMON NAME	California Sagebrush-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Artemisia californica-Mimulus aurantiacus Shrubland Association

California Sagebrush-Bush Monkey Flower Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 8214

Local Description

Summary:
This shrubland association occurs on moderately steep to steep southwest- to northeast-facing slopes at low elevations between 160–467 m. It is characterized by a codominance of *Artemisia californica* and *Mimulus aurantiacus* in the shrub layer. Although no individual species are strongly characteristic in the herbaceous layer, the native perennial grasses *Melica imperfecta* and *Leymus condensatus* occur in about half of the samples. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Western Fog Zone, Eastern Urban, Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 160–467 m, mean 327.8 m
Aspect: southwest to northeast
Slope: range 10–35 degrees, mean 27.3 degrees
Topography (micro; macro): flat or convex; middle to upper slope
Litter Cover: range 45–60%, mean 50%
Small Rock Cover: range 0–20%, mean 9.3%
Large Rock Cover: range 0–10%, mean 4%
Bare Ground: range 20–55%, mean 36.2%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Artemisia californica-Mimulus aurantiacus* Shrubland form an open to intermittent shrub layer (24–51%, mean 37%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–12%, mean 5.5%) at 01–1 m tall. Trees are occasionally emergent (0–7% cover, mean 0.9%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 35–52%, mean cover is 43.5%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Mimulus aurantiacus. Malosma laurina* is usually present. *Ribes malvaceum* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Melica imperfecta* and *Leymus condensatus.*

***Artemisia californica-Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	13.9	8.0	24.0	X	X	
	MIAU	*Mimulus aurantiacus*	100	10.9	5.0	20.0		X	
	MALA6	*Malosma laurina*	60	2.9	0.2	8.0			
	CEME	*Ceanothus megacarpus*	40	0.4	0.2	3.0			
	RIMA	*Ribes malvaceum*	40	0.2	0.2	1.0			
	CESP	*Ceanothus spinosus*	30	2.6	6.0	12.0			
	HEAR5	*Heteromeles arbutifolia*	30	0.6	2.0	2.0			
	MAFA	*Malacothamnus fasciculatus*	30	0.5	0.2	3.0			
	SALE3	*Salvia leucophylla*	30	0.5	0.2	4.0			
	TODI	*Toxicodendron diversilobum*	30	0.5	0.2	3.0			
	LOSC2	*Lotus scoparius*	30	0.3	0.2	2.0			
	BAPI	*Baccharis pilularis*	20	1.2	2.0	10.0			
	SAME5	*Sambucus mexicana*	20	0.6	0.2	6.0			
	ERCI5	*Eriogonum cinereum*	20	0.5	1.0	4.0			
	SAME3	*Salvia mellifera*	20	0.3	0.2	3.0			
	KECO	*Keckiella cordifolia*	20	0.3	1.0	2.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.2	1.0	1.0			
	ADFA	*Adenostoma fasciculatum*	20	0.1	0.2	1.0			
	LULO	*Lupinus longifolius*	20	0.1	0.2	1.0			
	HASQ2	*Hazardia squarrosa*	20	0.01	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	20	0.01	0.2	0.2			
	YUWH	*Yucca whipplei*	20	0.01	0.2	0.2			
Herb									
	MEIM	*Melica imperfecta*	60	0.9	0.2	4.0			
	LECO12	*Leymus condensatus*	50	1.0	0.2	8.0			
	BRNI	*Brassica nigra*	30	0.3	0.2	2.0			X
	BRDI3	*Bromus diandrus*	30	0.2	0.2	1.0			X
	BRMA3	*Bromus madritensis*	30	0.1	0.2	1.0			X
	CEME2	*Centaurea melitensis*	30	0.1	0.2	0.2			X
	CAPY2	*Carduus pycnocephalus*	20	0.1	0.2	1.0			X
	HIIN3	*Hirschfeldia incana*	20	0.1	0.2	1.0			X
	MAVU	*Marrubium vulgare*	20	0.1	0.2	1.0			X
	AVFA	*Avena fatua*	20	0.01	0.2	0.2			X
	BRHO2	*Bromus hordeaceus*	20	0.01	0.2	0.2			X
	CAMA24	*Calystegia macrostegia*	20	0.01	0.2	0.2			
	DICA14	*Dichelostemma capitatum*	20	0.01	0.2	0.2			
	MAMA8	*Marah macrocarpus*	20	0.01	0.2	0.2			
Cryptogam									
	LICHEN	*Lichen*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Bromus madritensis, Centaurea melitensis, Carduus pycnocephalus, Hirschfeldia incana, Marrubium vulgare, Avena fatua, Bromus hordeaceus, Ageratina adenophora, Schinus molle, Avena barbata, Cirsium vulgare, Erodium, Melilotus indicus, Nicotiana glauca, Senecio vulgaris

Samples Used in Description: (n = 10)
AA0885, rap0612, rap0951, rap1153, rap1375, rap1733, rap1768, rap1971, rap2487, rap2814

Comments:
In general, this association occurs in relatively steep coastal settings. It tends to occupy more mesic settings than the associations of the *Artemisia californica-Eriogonum fasciculatum* alliance.

Phases:
None

COMMON NAME	California Sagebrush-Bush Monkey Flower Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region, although this association is to be expected elsewhere in coastal central and southern California. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Traditionally in the shrublands with a codominance of *Artemisia californica* and other species (*Eriogonum fasciculatum, Salvia leucophylla*, etc.), California ecologists have erected mixed alliance names bases on the codominant species (e.g., Gordon and White 1994). This is the first case when a codominant *A. californica- Mimulus aurantiacus* Association has been described, so we have decided not to describe it as a new alliance but simply as an association within the broader view of the *Artemisia californica* Alliance. The proliferation of mixed alliances based on codominance is a philosophical dilemma that will continue to plague ecologists in California for some time to come.

References: Gordon and White 1994, Sawyer and Keeler-Wolf 1995

Artemisia californica-Eriogonum fasciculatum/Annual Grass-Herb Shrubland Association

California Sagebrush-California Buckwheat/Annual Grass-Herb Shrubland Association
***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance**
California Sagebrush-California Buckwheat Shrubland Alliance

Mapping Code: 3371

Local Description

Summary:
This shrubland association occurs on gentle to steep southwest- and southeast-facing slopes at low elevations between 99–442 m. It is characterized by a codominance of *Artemisia californica* and *Eriogonum fasciculatum* in the shrub layer. There are a variety of native and nonnative species in the herbaceous layer, none particularly characteristic. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 99–442 m, mean 277.2 m
Aspect: southwest and southeast
Slope: range 2–35 degrees, mean 22 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: range 25–30%, mean 27.5%
Small Rock Cover: range 2–27%, mean 14.8%
Large Rock Cover: range 2–50%, mean 16.8%
Bare Ground: range 3–45%, mean 22.5%
Parent Material: igneous or quaternary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Shrubland form an open to intermittent shrub layer (10–25%, mean 16.8%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (7–24%, mean 16.7%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 26–42%, mean cover is 33.8%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Eriogonum fasciculatum. Malosma laurina* is usually present. *Lotus scoparius* and *Salvia leucophylla* are sometimes included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Centaurea melitensis,* while *Hemizonia fasciculata, Bromus diandrus,* and *Hirschfeldia incana* are sometimes present.

***Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	5.7	4.0	7.5	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	5.4	2.0	8.0		X	
	MALA6	*Malosma laurina*	56	0.7	0.2	2.5			
	LOSC2	*Lotus scoparius*	44	0.5	0.2	2.5			
	SALE3	*Salvia leucophylla*	44	0.1	0.2	0.2			
	SAME3	*Salvia mellifera*	33	0.3	0.2	2.5			
	SAME5	*Sambucus mexicana*	33	0.3	0.2	2.5			
	RHIN2	*Rhus integrifolia*	33	0.3	0.2	2.0			
	ERCI5	*Eriogonum cinereum*	22	1.2	4.0	7.0			
	BASA4	*Baccharis salicifolia*	22	0.9	0.2	7.5			
	CEME	*Ceanothus megacarpus*	22	0.7	3.0	3.0			
	ENCA	*Encelia californica*	22	0.6	0.2	5.0			
	BRCA3	*Brickellia californica*	22	0.1	0.2	1.0			
	BAPI	*Baccharis pilularis*	22	0.01	0.2	0.2			
	MAFA	*Malacothamnus fasciculatus*	22	0.01	0.2	0.2			
Herb									
	HEFA	*Hemizonia fasciculata*	67	4.6	1.0	10.0			
	AVENA	*Avena*	56	2.6	1.0	7.0			X
	CEME2	*Centaurea melitensis*	56	1.8	0.2	8.0			X
	BRDI3	*Bromus diandrus*	44	1.2	1.0	5.0			X
	HIIN3	*Hirschfeldia incana*	44	1.0	1.0	3.0			X
	BROMU	*Bromus*	33	1.6	3.0	7.5			X
	AVFA	*Avena fatua*	33	0.7	2.0	2.5			X
	PHACE	*Phacelia*	33	0.4	0.2	2.0			
	ASFA	*Asclepias fascicularis*	22	0.3	0.2	2.5			
	LEFI11	*Lessingia filaginifolia*	22	0.3	0.2	2.5			
	LECO12	*Leymus condensatus*	22	0.1	0.2	1.0			
	NASSE	*Nassella*	22	0.1	0.2	1.0			
	MASA2	*Malacothrix saxatilis*	22	0.01	0.2	0.2			
Cryptogam									
	SEBI	*Selaginella bigelovii*	44	1.0	1.0	4.0			

Other Noteworthy Species:
Dudleya blochmaniae was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-3-2. Global rank is G2T2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 1of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Avena, Centaurea melitensis, Bromus diandrus, Hirschfeldia incana, Avena fatua, Bromus madritensis, Cortaderia, Brassica nigra, Piptatherum miliaceum, Carduus pycnocephalus, Foeniculum vulgare, Lactuca serriola, Lamarckia aurea

Samples Used in Description: (n = 9)
AA0014cc, AA0872, rap1957, rap1959, rap2115, rap2221, rap2258, rap2361, rap2395

Comments:
This association is scattered in stands from the immediate coast into the warmer inland areas of the study area. It often contains short-lived seral species such as *Lotus scoparius, Brickellia californica,* and *Malacothamnus fasciculatus* and tends to be a relatively open scrub of xeric exposures. Its seral relationship to certain chaparrals and coastal scrubs is suggested by the presence of *Salvia leucophylla, Encelia californica,* and *Ceanothus megacarpus* in some of the stands. The open nature of many of the stands is suggested by the relatively high constancy of shade-intolerant herbs such as *Hemizonia fasciculata and Avena* sp. This vegetation type appears to sometimes be related to anthropomorphic disturbance.

Phases:
None

COMMON NAME	California Sagebrush-California Buckwheat/Annual Grass-Herb Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is sampled in the California south coast (including Ventura to western Riverside and San Diego counties) and peninsular ranges (western Riverside County: Santa Ana Mountains, Perris Valley and Hills, and Fontana Plain and San Diego County: hills north of Ramona).

Nations:
United States

States or Provinces:
CA

Environmental Description:
The following information is derived from Evens and San (2005) and Klein and Evens (2005). Elevation ranges from 95 to 1,095 m with aspects variable (north to south). Slopes are gentle to steep, and topography is variable. Parent material is more often sedimentary or granite, less often gabbro, diorite, metavolcanic, or mixed granitic and metamorphic. Soil texture is more often sandy loam but varies from sand to clay loam.

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum* Shrubland form an open to continuous shrub layer (10–78%), where *Artemisia californica* usually codominates with *Eriogonum fasciculatum*. Shrubs sometimes occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0.2–60%,) at 0–1 m tall and includes a variety of native and nonnative species. Emergent trees occur infrequently (0.2–8% cover) at 5–15 m tall. Total vegetation cover is 26–88%. Occasional subdominant shrubs include *Salvia apiana*, *Lotus scoparius*, *Tetradymia comosa*, and *Lessingia filaginifolia*. The most common annuals in the herb understory include native *Amsinckia menziesii* and nonnatives *Bromus madritensis*, *Bromus diandrus*, *Bromus hordeaceus*, and *Avena fatua*.

Comments:
This is a widespread association in the central and south coastal areas of California. Similar stands have been seen as far north as San Benito County (Keeler-Wolf 2005 personal observation).

References:
Boyd et al. 1995, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995, White 1994

Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla Shrubland Association

California Sagebrush-California Buckwheat-Purple Sage Shrubland Association
***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance**
California Sagebrush-California Buckwheat Shrubland Alliance

Mapping Code: 3372

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 231–527 m. It is characterized by the codominance of *Artemisia californica, Eriogonum fasciculatum*, and *Salvia leucophylla* in the shrub layer. The herbaceous layer is not well developed. The emergent tree layer is generally absent but can include *Quercus agrifolia*.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 231–527 m, mean 366 m
Aspect: southeast and southwest
Slope: range 17–35 degrees, mean 30.8 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 8–30%, mean 19.5%
Small Rock Cover: range 18–35%, mean 25.8%
Large Rock Cover: range 2–15%, mean 6.3%
Bare Ground: range 25–50%, mean 40%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla* Shrubland form an open to intermittent shrub layer (18–41%, mean 32.6%). Shrubs occur in two different strata with low shrubs at 0-1 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (1–13%, mean 4.1%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 23–45%, mean cover is 37.1%.

In this association, the shrub layer is characterized by *Artemisia californica, Eriogonum fasciculatum, Salvia leucophylla,* and *Yucca whipplei. Malosma laurina* is often present, and *Salvia apiana* is occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Centaurea melitensis*, while *Brassica nigra* is often included.

***Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	12.4	8.0	20.0	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	10.1	2.5	19.0		X	
	SALE3	*Salvia leucophylla*	100	6.7	2.0	15.0		X	
	YUWH	*Yucca whipplei*	75	1.0	0.2	2.5		X	
	MALA6	*Malosma laurina*	62	1.3	0.2	3.0			
	SAAP2	*Salvia apiana*	50	0.7	0.2	2.5			
	RHOV	*Rhus ovata*	38	1.0	2.5	3.0			
	ENCA	*Encelia californica*	38	0.1	0.2	0.2			
	MAFA	*Malacothamnus fasciculatus*	25	0.7	2.5	3.0			
	LOSC2	*Lotus scoparius*	25	0.5	0.2	4.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.3	0.2	2.5			
	SAME3	*Salvia mellifera*	25	0.3	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	75	1.2	0.2	3.0		X	X
	BRNI	*Brassica nigra*	62	0.7	0.2	2.5			X
	BRDI3	*Bromus diandrus*	38	0.6	1.0	2.5			X
	AVENA	*Avena*	25	0.4	0.2	3.0			X
	HEFA	*Hemizonia fasciculata*	25	0.4	1.0	2.0			
	BRMA3	*Bromus madritensis*	25	0.3	1.0	1.0			X
	HIIN3	*Hirschfeldia incana*	25	0.2	0.2	1.0			X
	NAPU4	*Nassella pulchra*	25	0.2	0.2	1.0			
	CUCA	*Cuscuta californica*	25	0.1	0.2	0.2			
	LECO12	*Leymus condensatus*	25	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus diandrus, Avena, Bromus madritensis, Hirschfeldia incana, Bromus hordeaceus, Foeniculum vulgare

Samples Used in Description: (n = 8)
AA0189cc, AA0267cc, AA0536, rap2087, rap2244, rap2260, rap2603, rap2823

Comments:
This association differs from the *Artemisia californica-Eriogonum fasciculatum* Association by having a constant codominance of *Salvia leucophylla* along with the other two major shrubs. It is a relatively uncommon association in the study area and is usually found in the inland portions of the area on very dry, warm, steep south-facing slopes. It is likely to be endemic to the general area of the Ventura region of the coastal sage scrub zone (*sensu* Westman 1981)

Phases:
None

COMMON NAME	California Sagebrush-California Buckwheat-Purple Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Westman 1981

Artemisia californica-Eriogonum fasciculatum-Salvia mellifera Shrubland Association

California Sagebrush-California Buckwheat-Black Sage Shrubland Association
***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance**
California Sagebrush-California Buckwheat Shrubland Alliance

Mapping Code: 3373

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 0–588 m. It is characterized by a codominance of *Artemisia californica, Eriogonum fasciculatum*, and *Salvia mellifera* in the shrub layer. There is an insignificant herbaceous layer. The emergent tree layer is generally absent but may include *Quercus agrifolia*.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Western Fog Zone, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 0–588 m, mean 326.7 m
Aspect: variable
Slope: range 0–35 degrees, mean 23.7 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridge
Litter Cover: range 15–35%, mean 21.9%
Small Rock Cover: range 8–45%, mean 18.7%
Large Rock Cover: range 0–15%, mean 5.5%
Bare Ground: range 25–65%, mean 46.4%
Parent Material: igneous or sedimentary
Soil Texture: medium to moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum-Salvia mellifera* Shrubland form an open to intermittent shrub layer (20–39%, mean 30.8%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–8%, mean 2.7%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 20–42%, mean cover is 33.7%.

In this association, the shrub layer is characterized by *Artemisia californica, Eriogonum fasciculatum,* and *Salvia mellifera. Malosma laurina* and *Encelia californica* are usually included in this layer. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Centaurea melitensis.* Other herbs sometimes include nonnative annual *Bromus* species.

***Artemisia californica-Eriogonum fasciculatum-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	25	0.2	0.2	1.0			
Shrub									
	ARCA11	*Artemisia californica*	100	9.8	3.0	16.0	X		
	ERFA2	*Eriogonum fasciculatum*	100	6.5	2.5	12.0	X		
	SAME3	*Salvia mellifera*	100	4.1	2.5	8.0	X		
	ENCA	*Encelia californica*	69	2.4	0.2	9.0			
	MALA6	*Malosma laurina*	69	2.1	0.2	10.0			
	YUWH	*Yucca whipplei*	56	0.9	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	44	1.4	0.2	7.0			
	LOSC2	*Lotus scoparius*	38	0.7	0.2	2.5			
	SALE3	*Salvia leucophylla*	31	0.8	2.0	3.0			
	MIAU	*Mimulus aurantiacus*	31	0.5	0.2	4.0			
	RHIN2	*Rhus integrifolia*	25	0.5	0.2	2.5			
	CEME	*Ceanothus megacarpus*	25	0.4	0.2	2.5			
Herb									
	BROMU	*Bromus*	38	0.6	0.2	4.0			
	CEME2	*Centaurea melitensis*	31	0.4	0.2	2.5			X
	BRMA3	*Bromus madritensis*	25	0.2	0.2	1.0			X

Other Noteworthy Species:
Juglans californica was found in 1of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Brassica nigra, Avena, Erodium cicutarium, Marrubium vulgare, Bromus diandrus, Hirschfeldia incana, Avena fatua, Brassica, Foeniculum vulgare, Lobularia maritima

Samples Used in Description: (n = 16)
AA0231cc, AA0234cc, AA0253cc, AA0366cc, AA0757cc, AA0758, AA0847, AA1002, AA1052, rap0806, rap0813, rap1229, rap1352, rap1625m, rap1626m, rap2264

Comments:
This association is found in the hotter and drier exposures of the study area but generally within the zone of morning summer fog. It is not so strongly restricted to south-facing slopes as the *A. californica-E. fasciculatum-S. leucophylla* Association. It probably ranges more widely than that association as well. It would be expected to occur in other parts of the central and south coastal areas of California.

Phases:
None

COMMON NAME California Sagebrush-California Buckwheat-Black Sage Shrubland Association

SYNONYM None

PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in other parts of central and southern coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Atriplex lentiformis Shrubland Alliance

Quail Bush Shrubland Alliance

Mapping Code: 2330

Local Description

Summary:
This shrubland alliance occurs on gentle to steep southeast- and southwest-facing slopes at low elevations between 0–171 m. It is dominated by *Atriplex lentiformis* in the shrub layer and by several nonnative herbs and forbs in the herbaceous layer.

Distribution:
This alliance is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–171 m, mean 20.6 m
Aspect: southeast and southwest
Slope: range 0–35 degrees, mean 11.6 degrees
Topography (micro; macro): flat to undulating; lower and bottom slope
Litter Cover: range 45–95%, mean 70%
Small Rock Cover: range 0–25%, mean 10.2%
Large Rock Cover: range 0–2%, mean 0.2%
Bare Ground: range 0–80%, mean 41.2%
Parent Material: sedimentary and quaternary
Soil Texture: fine clay

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (8–55%, mean 25.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–34%, mean 13.3%) at 0–1 m tall. Trees are occasionally emergent (0–6% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–64%, mean cover is 39.4%.

In this association, the shrub layer is characterized by *Atriplex lentiformis. Baccharis pilularis* and *Myoporum laetum* are often present, while *Rhus integrifolia* and *Artemisia californica* are occasionally included in this layer. The tree layer is rare, emergen, and open. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Bromus madritensis, Carpobrotus edulis,* and *Malacothrix saxatilis.*

Atriplex lentiformis Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ATLE	*Atriplex lentiformis*	83	16.5	6.0	55.0	X	X	
	BAPI	*Baccharis pilularis*	67	1.5	0.2	8.0			
	MYLA5	*Myoporum laetum*	67	0.6	0.2	3.0			X
	RHIN2	*Rhus integrifolia*	50	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	50	0.3	0.2	1.0			
	ENCA	*Encelia californica*	42	1.7	2.0	8.0			
	MALA6	*Malosma laurina*	42	0.9	0.2	10.0			
	ATRIP	*Atriplex*	25	3.3	6.0	18.0			
	BASA4	*Baccharis salicifolia*	25	1.0	0.2	12.0			
Herb									
	BRNI	*Brassica nigra*	58	0.3	0.2	1.0			X
	BRMA3	*Bromus madritensis*	50	2.3	1.0	8.0			X
	MASA2	*Malacothrix saxatilis*	42	0.5	0.2	4.0			
	CAED3	*Carpobrotus edulis*	42	0.4	0.2	2.0			X
	PESE3	*Pennisetum setaceum*	33	2.3	1.0	17.0			X
	FOVU	*Foeniculum vulgare*	33	0.2	0.2	2.0			X
	SATR12	*Salsola tragus*	33	0.1	0.2	0.2			X
	DISP	*Distichlis spicata*	25	1.0	1.0	8.0			
	EUTE10	*Euphorbia terracina*	25	0.2	0.2	1.0			X
	BRDI3	*Bromus diandrus*	25	0.1	0.2	1.0			X

Other Noteworthy Species:
None

Nonnative Species:
Myoporum laetum, Brassica nigra, Bromus madritensis, Carpobrotus edulis, Pennisetum setaceum, Foeniculum vulgare, Salsola tragus, Euphorbia terracina, Bromus diandrus, Medicago polymorpha, Melilotus albus, Melilotus indicus, Atriplex semibaccata, Centaurea melitensis, Cortaderia, Lobularia maritima, Malva parviflora, Mesembryanthemum crystallinum, Nicotiana glauca, Oxalis pes-caprae, Bassia hyssopifolia, Piptatherum miliaceum, Spartium junceum, Bougainvillea, Avena fatua, Cakile maritima, Chenopodium murale, Cynodon dactylon, Erodium, Hirschfeldia incana, Limonium perezii, Mesembryanthemum nodiflorum, Picris echioides, Ricinus communis, Sonchus oleraceus, Vicia sativa

Samples Used in Description: (n = 12)
AA0439, rap0118, rap0669, rap0876, rap1010, rap1015, rap1021, rap1022m, rap1111, rap1200, rap1247, rap2779

Comments:
The local stands of this alliance may have been largely the result of plantings by CalTrans and other agencies along the Highway 1 corridor. Several of these stands appear self-perpetuating now. The decision was made to make no further attempt to differentiate these stands into local associations as a result of their possible introduced nature and the general heterogeneity of the species composition. Note the extensive list of nonnative species associated with these stands, perhaps another indication of their nonnatural origins.

Phases:
None

COMMON NAME	Quail Bush Alliance
SYNONYM	*Atriplex (lentiformis, polycarpa)* Shrubland Alliance (NatureServe 2005), Mixed Saltbush Series (Sawyer and Keeler-Wolf 1995)
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.A. Evergreen shrubland
FORMATION GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
FORMATION SUBGROUP	III.A.5.N. Natural/Seminatural extremely xeromorphic evergreen shrubland
FORMATION NAME	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Atriplex lentiformis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance is also known from the western edge of the Sonoran Desert region in Anza-Borrego Desert State Park (Keeler-Wolf et al. 1998). Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This alliance has been recently segregated from the previously defined *Atriplex lentiformis-A. polycarpa* Alliance (Sawyer and Keeler-Wolf 1995). Based on recent plot data collected over the past 10 years, it is now apparent that both of these species tend to segregate and form their own alliances with frequently different environmental and species characteristics.

References:
Keeler-Wolf et al. 1998, Sawyer and Keeler-Wolf 1995

Baccharis pilularis/Annual Grass-Herb Shrubland Association

Coyote Brush/Annual Grass-Herb Shrubland Association
***Baccharis pilularis* Shrubland Alliance**
Coyote Brush Shrubland Alliance

Mapping Code: 2311

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes with flat to variable aspect at low elevations between 1–568 m. It is characterized by the dominance of *Baccharis pilularis* in the shrub layer and a variety of nonnative largely annual grasses and herbs in the herbaceous layer. The emergent tree layer includes occasional ruderal trees such as *Schinus molle, Eucalyptus* spp., and *Phoenix canariensis* as well as the native *Quercus agrifolia*.

Distribution:
This association is sampled in the Western Fog Zone, Eastern Urban, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains of the study area.

Environmental Description:
Elevation: range 1–568 m, mean 179 m
Aspect: commonly none/flat, sometimes variable
Slope: range 0–35 degrees, mean 6.7 degrees
Topography (micro; macro): flat; bottom to mid slope
Litter Cover: range 45–60%, mean 51.3%
Small Rock Cover: range 0–10%, mean 3.6%
Large Rock Cover: range 0–2%, mean 0.3%
Bare Ground: range 5–55%, mean 25.1%
Parent Material: primarily quaternary, some sedimentary
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Baccharis pilularis/*Annual Grass-Herb Shrubland form an open to intermittent shrub layer (6–55%, mean 27.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to continuous (1–71%, mean 17%) at 0–2 m tall. Trees are occasionally emergent (0–3% cover, mean 0.9%) with hardwoods at 0–15 m tall. Total vegetation cover is 9–80%, mean cover is 44.9%.

In this association, the shrub layer is characterized by an abundance of *Baccharis pilularis. Artemisia californica, Sambucus Mexicana,* and *Toxicodendron diversilobum* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Schinus molle, Eucalyptus, Juglans californica,* and *Phoenix canariensis* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra* and *Centaurea melitensis.* Other herbs present may include *Bromus diandrus, Phalaris aquatica, Foeniculum vulgare,* and *Erodium cicutarium*.

***Baccharis pilularis*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	100	23.3	4.0	50.0	X	X	
	ARCA11	*Artemisia californica*	39	0.4	0.2	4.0			
	SAME5	*Sambucus mexicana*	33	0.4	0.2	5.0			
	TODI	*Toxicodendron diversilobum*	22	0.2	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	50	0.6	0.2	2.5			X
	CEME2	*Centaurea melitensis*	39	0.3	0.2	2.5			X
	BRDI3	*Bromus diandrus*	33	4.0	0.2	45.0			X
	PHAQ	*Phalaris aquatica*	28	4.7	0.2	70.0			X
	FOVU	*Foeniculum vulgare*	28	1.4	0.2	15.0			X
	ERCI6	*Erodium cicutarium*	22	0.1	0.2	1.0			X

Other Noteworthy Species:
Juglans californica was found in 1of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus diandrus, Phalaris aquatica, Foeniculum vulgare, Erodium cicutarium, Hirschfeldia incana, Carduus pycnocephalus, Marrubium vulgare, Avena, Melilotus albus, Bromus madritensis, Schinus molle, Bromus hordeaceus, Ricinus communis, Salsola tragus, Conium maculatum, Chenopodium ambrosioides, Eucalyptus, Myoporum laetum, Ailanthus altissima, Silybum marianum, Anagallis arvensis, Eucalyptus, Melilotus, Nicotiana glauca, Schinus molle, Avena barbata, Conyza canadensis, Erodium, Galium aparine, Lactuca serriola, Lamarckia aurea, Malva parviflora, Melilotus indicus, Pennisetum setaceum, Phoenix canariensis

Samples Used in Description: (n = 18)
AA0352cc, AA0468cc, AA0506cc, rap0066, rap0080m, rap0081, rap0083, rap0247, rap0896, rap0899, rap1135, rap1137, rap1747, rap2047, rap2068, rap2503, rap2536rlv, rap2862rlv

Comments:
This association is indicative of a disturbed seral stage that, in these mountains, typically comes following the reversion of cleared pastureland or nonnative grassland back to shrubland. *B. pilularis* behaves similarly in these mountains as it does in other areas of northern California (e.g., Bartolome 1989) where it often forms the first wave of woody species to recolonize cleared land. This association has been defined from northern coastal California (Keeler-Wolf et al. 2003), and it is likely to be widespread throughout the coast ranges from northern to southern California. The relatively xeric climate of the local study area compared to areas in northern California where this association has been reported is reflected in a low slope position and locally mesic setting of most of the stands. Stands in the northern part of the state may occur in many topographic settings.

Phases:
None

COMMON NAME	Coyote Brush/Annual Grass-Herb Shrubland Association
SYNONYM	*Baccharis pilularis*-Annual Grassland Association (Keeler-Wolf et al. 2003), *Baccharis/*Annual Grasses (Keeler-Wolf and Vaghti 2000)
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Baccharis pilularis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is well known from the Santa Monica Mountains region. Preliminary descriptions based on relatively little plot information have been developed from Suisun Marsh (Keeler-Wolf and Vaghti 2000), Point Reyes (Keeler-Wolf et al. 2003), and Coyote Hills of Santa Clara County (Evens and San 2004).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bartolome 1989, Evens and San 2004, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003

Baccharis pilularis-Artemisia californica Shrubland Association

Coyote Brush-California Sagebrush Shrubland Association
***Baccharis pilularis* Shrubland Alliance**
Coyote Brush Shrubland Alliance

Mapping Code: 2313

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of flat to variable aspect at low elevations between 2–547 m. It is characterized by a dominance of *Baccharis pilularis* and subdominance of *Artemisia californica* in the shrub layer. The herbaceous layer is more variable than the *B. pilularis*/Annual Grass-Herb Association and tends to have more cover by tall exotic herbs such as *Brassica nigra* and *Foeniculum vulgare.* The emergent tree layer is generally absent but can include exotic ruderals such as *Schinus molle* and *Eucalyptus* spp. as well as the native *Quercus lobata* and *Q. agrifolia*.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Immediate Coast, Simi Hills Inland, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 2–547 m, mean 202.2 m
Aspect: flat to variable
Slope: range 0–35 degrees, mean 9.9 degrees
Topography (micro; macro): flat, undulating, or concave; bottom to middle slope
Litter Cover: range 5–85%, mean 46.7%
Small Rock Cover: range 0–70%, mean 12.7%
Large Rock Cover: range 0–15%, mean 1.4%
Bare Ground: range 0–74%, mean 30.4%
Parent Material: quaternary, igneous, or sedimentary
Soil Texture: moderately fine silty or sandy clay loam

Vegetation Description:
Stands of *Baccharis pilularis-Artemisia californica* Shrubland form an open to intermittent shrub layer (8–51%, mean 32.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–45%, mean 8.6%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 1.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 28–55%, mean cover is 41.9%.

In this association, the shrub layer is characterized by *Baccharis pilularis* and *Artemisia californica. Salvia leucophylla* is often present, while *Malosma laurina* is occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Eucalyptus, Schinus molle,* and *Quercus lobata* at low cover. The herbaceous layer is diverse and often includes *Brassica nigra*. *Leymus condensatus, Bromus madritensis, Foeniculum vulgare,* and *Centaurea melitensis* are occasionally present in this layer.

***Baccharis pilularis-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	100	18.5	5.0	37.0		X	
	ARCA11	*Artemisia californica*	90	6.1	0.2	25.0		X	
	SALE3	*Salvia leucophylla*	51	1.9	0.2	15.0			
	MALA6	*Malosma laurina*	45	2.6	0.2	15.0			
	SAME5	*Sambucus mexicana*	25	0.8	0.2	9.0			
	BASA4	*Baccharis salicifolia*	20	0.4	0.2	7.0			
Herb									
	BRNI	*Brassica nigra*	43	0.5	0.2	7.0			X
	LECO12	*Leymus condensatus*	24	1.0	0.2	17.0			
	BRMA3	*Bromus madritensis*	24	0.2	0.2	4.0			X
	FOVU	*Foeniculum vulgare*	22	0.5	0.2	12.0			X
	CEME2	*Centaurea melitensis*	22	0.2	0.2	2.5			X
	NASSE	*Nassella*	20	0.5	0.2	7.0			

Other Noteworthy Species:
Juglans californica was found in 2 of 51 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Foeniculum vulgare, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Carduus pycnocephalus, Nicotiana glauca, Bromus hordeaceus, Myoporum laetum, Avena, Medicago polymorpha, Pennisetum setaceum, Marrubium vulgare, Phalaris aquatica, Eucalyptus, Schinus molle, Silybum marianum, Picris echioides, Rumex crispus, Salsola tragus, Stellaria media, Conium maculatum, Melilotus officinalis, Euphorbia terracina, Lolium, Schinus molle, Carpobrotus edulis, Erodium, Melilotus, Melilotus indicus, Avena fatua, Carpobrotus, Cortaderia, Lactuca serriola, Mesembryanthemum nodiflorum, Oxalis pes-caprae, Plantago major

Samples Used in Description: (n = 51)
AA0059cc, AA0146cc, AA0245cc, AA0285cc, AA0349cc, AA0356cc, AA0363cc, AA0370cc, AA0378cc, AA0396cc, AA0443cc, AA0573, AA0586, AA0659, AA0745cc, AA0957, AA1018, AA1102, AA1198, AA1201, AA1222, rap0044, rap0069, rap0076, rap0077m, rap0098, rap0649, rap0667, rap0729, rap0894, rap0935, rap0973, rap1044, rap1086, rap1087, rap1431, rap1456, rap1672m, rap1751, rap1867, rap1869, rap1929, rap1974, rap2124, rap2265, rap2296, rap2549, rap2583, rap2736, rap2738, rap2739

Comments:
This is the most common expression of the *Baccharis pilularis* Alliance locally. As with the *B. pilularis*/Annual Grass-Herb Association, this association is also indicative of seral conditions and is often found in relatively mesic low-lying settings. The large number of nonnative species is also indicative of the disturbed/seral nature of this association. In the La Jolla Valley area of the park, there are stands that appear to be colonizing annual grassland areas, especially in regions of flood disturbance or erosion. In many cases, die-off of the *Baccharis* was noted. Three phases are identified in this type exhibiting augmentation of stands with higher cover and frequency of *Malosma laurina* or *Salvia leucophylla*.

Phases:
Baccharis pilularis-Malosma laurina-Artemisia californica (Coyote Brush-Laurel Sumac-California Sagebrush) Phase [2314]
Baccharis pilularis-Artemisia californica (Coyote Brush-California Sagebrush) Phase [2313]
Baccharis pilularis-Artemisia californica-Salvia leucophylla (Coyote Brush-California Sagebrush-Purple Sage) Phase [2315]

COMMON NAME	Coyote Brush-California Sagebrush Shrubland Association
SYNONYM	*Baccharis pilularis-Artemisia californica-Toxicodendron diversilobum/Monardella villosa* Association (Keeler-Wolf et al. 2003), *Baccharis pilularis-Artemisia californica-Heteromeles arbutifolia* Shrubland Association (Evens and San 2004), *Baccharis pilularis-Artemisia californica (*Heady et al. 1977), *Baccharis pilularis-Artemisia californica* Alliance (Borchert et al. 2004)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Baccharis pilularis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is well known from the Santa Monica Mountains. Similar associations with *Baccharis pilularis* and *Artemisia californica* as main components have been noted as far south as San Diego County (Heady et al. 1977, Kirkpatrick and Hutchinson 1977, Evens and San 2005) and as far north as the San Francisco Bay region (Keeler-Wolf et al. 2003, Evens and San 2004). Borchert et al. 2004 describes a series of 11 stands they call the *B. pilularis-A. californica* Alliance from the coastal portions of the Los Padres National Forest in Monterey County in which the two species codominate. In the Santa Monica Mountains, *B. pilularis* usually dominates, so the association is placed in the *B. pilularis* Alliance. In a few samples in the SAMO study area, *B. pilularis* codominates with *A. californica*; however, not enough samples are present to warrant an alliance designation.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Although similar associations have been described elsewhere, there are minor differences in some of these from the presently described association. There is some debate about whether to to place the associations into the *Baccharis pilularis* Alliance or maintain the mixed *Baccharis pilularis-Artemisia californica* Alliance to contain a range of associations characterized by the presence or codominance of these two species of shrubs. Currently Borchert et al. 2004 recognizes a mixed alliance. However, the samples of this association from Santa Monica Mountains are placed in the *Baccharis pilularis* Alliance since *B. pilularis* is generally dominant while *A. californica* is subdominant.

References:
Borchert et al. 2004, Evens and San 2004, Evens and San 2005, Heady et al. 1977, Keeler-Wolf et al. 2003, Kirkpatrick and Hutchinson 1977

Baccharis salicifolia Riparian Shrubland Association

Mule Fat Riparian Shrubland Association
***Baccharis salicifolia* Shrubland Alliance**
Mule Fat Shrubland Alliance

Mapping Code: 2212

Local Description

Summary:
This shrubland association occurs on gentle to somewhat steep slopes of flat aspect at low elevations between 2–501 m. It is characterized by *Baccharis salicifolia* in the shrub layer and a variety of native and nonnative mesophytic species in the herbaceous layer, perhaps the most characteristic of which is *Artemisia douglasiana*. The emergent tree layer includes riparian species such as *Platanus racemosa*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Western Fog Zone, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 2–501 m, mean 200.9 m
Aspect: flat
Slope: range 0–15 degrees, mean 2.8 degrees
Topography (micro; macro): flat or concave; slope bottom
Litter Cover: range 2–80%, mean 41.9%
Small Rock Cover: range 2–70%, mean 21.7%
Large Rock Cover: range 0–75%, mean 10.7%
Bare Ground: range 2–70%, mean 22.9%
Parent Material: quaternary or sedimentary
Soil Texture: coarse to medium loamy sand

Vegetation Description:
Stands of *Baccharis salicifolia*-Riparian Shrubland form an open to intermittent shrub layer (4–48%, mean 27.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–28%, mean 8.4%) at 0–2 m tall. Trees are occasionally emergent (0–15% cover, mean 3.1%) with hardwoods at 0–15 m tall. Total vegetation cover is 10–65%, mean cover is 38.5%.

In this association, the shrub layer is characterized by *Baccharis salicifolia. Baccharis pilularis*, *Salix lasiolepis, Nicotiana glauca, Artemisia californica,* and *Malosma laurina* are occasionally included in this layer. The tree layer is emergent and open and may include *Platanus racemosa, Salix laevigata, or Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Artemisia douglasiana,* while *Piptatherum miliaceum* and *Brassica nigra* are sometimes present.

***Baccharis salicifolia*-Riparian Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	26	0.3	0.2	3.0			
Shrub									
	BASA4	*Baccharis salicifolia*	100	23.6	3.0	48.0	X	X	
	BAPI	*Baccharis pilularis*	37	0.6	0.2	5.0			
	SALA6-M	*Salix lasiolepis*	33	0.6	0.2	4.0			
	NIGL	*Nicotiana glauca*	30	0.2	0.2	4.0			X
	ARCA11	*Artemisia californica*	30	0.1	0.2	2.0			
	MALA6	*Malosma laurina*	26	0.2	0.2	2.0			
	SAME3	*Salvia mellifera*	22	0.2	0.2	2.0			
	LOSC2	*Lotus scoparius*	22	0.1	0.2	2.0			
Herb									
	ARDO3	*Artemisia douglasiana*	56	0.7	0.2	3.0			
	PIMI3	*Piptatherum miliaceum*	41	0.5	0.2	4.0			X
	BRNI	*Brassica nigra*	37	0.7	0.2	12.0			X
	HIIN3	*Hirschfeldia incana*	33	0.9	0.2	12.0			X
	BRDI3	*Bromus diandrus*	26	0.6	0.2	8.0			X
	COMA2	*Conium maculatum*	26	0.5	0.2	5.0			X
	FOVU	*Foeniculum vulgare*	26	0.2	0.2	2.0			X
	BRMA3	*Bromus madritensis*	22	0.2	0.2	2.0			X
	CEME2	*Centaurea melitensis*	22	0.1	0.2	2.0			X

Other Noteworthy Species:
Juglans californica was found in 4 of 27 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Brassica nigra, Hirschfeldia incana, Nicotiana glauca, Bromus diandrus, Conium maculatum, Foeniculum vulgare, Bromus madritensis, Centaurea melitensis, Marrubium vulgare, Euphorbia terracina, Melilotus indicus, Cynodon dactylon, Silybum marianum, Avena, Ricinus communis, Rumex crispus, Carduus pycnocephalus, Salsola tragus, Rorippa nasturtium-aquaticum, Spartium junceum, Arundo donax, Phalaris aquatica, Conyza canadensis, Carpobrotus edulis, Melilotus albus, Centaurea repens, Crypsis schoenoides, Bromus hordeaceus, Apium graveolens, Cirsium vulgare, Plantago major, Anagallis arvensis, Chenopodium album, Erodium cicutarium, Eucalyptus, Lactuca serriola, Lolium, Malva parviflora, Polypogon monspeliensis, Sonchus, Tropaeolum majus

Samples Used in Description: (n = 27)
AA0300cc, AA0841, AA0859, AA1056, AA1144, rap0300, rap0508, rap0893, rap0977, rap1480, rap1481, rap1484, rap1687, rap1691, rap1749, rap1902, rap2008, rap2274, rap2328, rap2339, rap2370, rap2403, rap2437, rap2513, rap2515, rap2675, rap2681

Comments:
This is a common riparian scrub association in the study area, reflecting either intermittent flooding or regular disturbance (by scouring) conditions. It is very similar, if not identical, to many other stands dominated by *Baccharis salicifolia* in the south coastal area of California. As with

many riparian vegetation types, these stands are inherently variable and, hence, this treatment is relatively broad.

Phases:
None

COMMON NAME	Mule Fat Riparian Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.B. Deciduous shrubland
FORMATION GROUP	III.B.2. Cold-deciduous shrubland
FORMATION SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION NAME	III.B.2.N.e. Seasonally flooded cold-deciduous shrubland
ALLIANCE	*Baccharis salicifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. In the broad sense, these types of *B. salicifolia* stands range widely from northern Sacramento Valley and south into Baja California, Mexico.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar *Baccharis salicifolia-Sambucus mexicana* Association has been described from western Riverside County (Klein and Evens 2005). Very similar stands occur at least as far north as Shasta County in the Sacramento Valley of California (Keeler-Wolf personal observation 2004). Because of the inherent variability of these riparian scrublands, it remains to be seen if these associations should stay separate.

References:
Klein and Evens 2005

Ceanothus crassifolius Shrubland Association

Hoary Leaf Ceanothus Shrubland Association
***Ceanothus crassifolius* Shrubland Alliance**
Hoary leaf Ceanothus Shrubland Alliance

Mapping Code: 2063

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes at low elevations between 312 and 640 m. It is solely dominated by *Ceanothus crassifolius* in the shrub layer. Trees and herbs are relatively low in cover and constancy.

Distribution:
This association is sampled in the Simi Hills Inland, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 312–640 m, mean 491.1 m
Aspect: variable, but more often northeast
Slope: range 23–35 degrees, mean 33.7 degrees
Topography (micro; macro): variable but more often undulating; lower to middle slopes
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: no data
Soil Texture: no data

Vegetation Description:
Stands of *Ceanothus crassifolius* Shrubland form an intermittent shrub layer (45–60%, mean 53.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is sparse (0–3%, mean 0.6%) at 0–1 m tall. Trees rarely occur as emergent (0–0% cover, mean 0%) with hardwoods at 0–5 m tall. Total vegetation cover is 45–60%, mean cover is 54.3%.

In this association, the shrub layer is solely dominated by *Ceanothus crassifolius. Heteromeles arbutifolia* and *Malosma laurina* are frequently included in this layer at relatively low cover. The tree and herbaceous layers are sparse in cover and low in constancy, though they may include *Platanus racemosa, Quercus agrifolia, Marah macrocarpus,* and *Leymus condensatus.*

***Ceanothus crassifolius* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CECR	*Ceanothus crassifolius*	100	43.0	32.0	55.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	89	2.1	0.2	4.0		X	
	MALA6	*Malosma laurina*	78	1.2	0.2	3.0		X	
	ADFA	*Adenostoma fasciculatum*	67	1.9	1.0	5.0			
	RHOV	*Rhus ovata*	56	1.4	0.2	9.0			
	SAME3	*Salvia mellifera*	56	1.3	1.0	4.0			
	CEBE3	*Cercocarpus betuloides*	33	0.7	0.2	4.0			
	CESP	*Ceanothus spinosus*	22	0.4	1.0	3.0			

Other Noteworthy Species:
None

Nonnative Species:
Spartium junceum

Samples Used in Description: (n = 9)
AA0034cc, AA0291cc, AA0336, AA0651, AA1210, rap1677m, rap2041, rap2331, rap2824

Comments:
These *Ceanothus crassifolius* Association stands typically occur in relatively inland, continental settings locally and are not found close to the coast within the summer fog zone. Most local stands with *Ceanothus crassifolius* have been placed within the mixed *Adenostoma fasciculatum-Ceanothus crassifolius* Alliance.

Phases:
None

COMMON NAME	Hoary Leaf Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus crassifolius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. It is likely to occur somewhat further north and south in south coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This additional information from Borchert et al. 2004 probably largely applies to the *C. crassifolius* Association within the Santa Ynez Mountains of Santa Barbara County. The hoary leaf ceanothus alliance occupies the middle and upper slopes of east- and souht-facing aspects between elevations of 2,000 and 3,600 feet.

Vegetation Description:
Based on 16 plots sampled in the Santa Ynez Mountains of Santa Barbara County, Borchert et al. 2004 add this information to the local description above: Hoary leaf ceanothus has an average cover of 70%. Chamise and sugar bush have relatively high constancies (88% and 71% respectively) but low (< 10%) averge covers.

Comments:
See local description.

References:
Borchert et al. 2004

Ceanothus crassifolius-Malosma laurina Shrubland Association

Hoary Leaf Ceanothus-Laurel Sumac Shrubland Association
***Ceanothus crassifolius* Shrubland Alliance**
Hoary Leaf Ceanothus Shrubland Alliance

Mapping Code: 2065

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 337–675 m. It is characterized by a dominance of *Ceanothus crassifolius* and subdominance of *Malosma laurina* in the shrub layer and an insignificant herbaceous layer. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This association is sampled in the Simi Hills Inland, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 337–675 m, mean 475.5 m
Aspect: variable
Slope: range 15–35 degrees, mean 28.5 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: range 8–8%, mean 8%
Small Rock Cover: range 6–20%, mean 13.3%
Large Rock Cover: range 0–10%, mean 5%
Bare Ground: range 10–61%, mean 33.7%
Parent Material: sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Ceanothus crassifolius-Malosma laurina* Shrubland form an open to intermittent shrub layer (31–60%, mean 49.1%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–10%, mean 2.1%) at 0–1 m tall. Trees are infrequently present. Total vegetation cover is 41–60%, mean cover is 51.1%.

In this association, the shrub layer is characterized by *Malosma laurina* and *Ceanothus crassifolius. Rhus ovata, Heteromeles arbutifolia, Adenostoma fasciculatum, Salvia mellifera,* and *Eriogonum fasciculatum* are usually included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Marah macrocarpus, Phacelia parryi, Chaenactis artemisiifolia,* and *Gnaphalium bicolor.*

***Ceanothus crassifolius-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	QUAG-M	*Quercus agrifolia*	22	0.01	0.2	0.2			
Shrub									
	CECR	*Ceanothus crassifolius*	100	25.0	12.0	45.0	X	X	
	MALA6	*Malosma laurina*	100	10.6	2.5	22.0		X	
	RHOV	*Rhus ovata*	78	1.8	0.2	4.0		X	
	ADFA	*Adenostoma fasciculatum*	67	1.3	0.2	4.0			
	HEAR5	*Heteromeles arbutifolia*	67	1.2	0.2	4.0			
	SAME3	*Salvia mellifera*	56	4.7	0.2	15.0			
	ERFA2	*Eriogonum fasciculatum*	56	0.8	0.2	2.5			
	CEBE3	*Cercocarpus betuloides*	33	2.3	2.5	15.0			
	YUWH	*Yucca whipplei*	33	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	22	0.8	2.0	5.0			
	KECO	*Keckiella cordifolia*	22	0.1	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	22	0.1	0.2	1.0			
	RHIL	*Rhamnus ilicifolia*	22	0.1	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	22	0.01	0.2	0.2			
	SALE3	*Salvia leucophylla*	22	0.01	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	22	0.01	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Avena, Bromus madritensis, Avena barbata, Brassica nigra, Bromus diandrus, Centaurea melitensis, Melilotus indicus

Samples Used in Description: (n = 9)
AA0030cc, AA0293cc, rap0507m, rap0558m, rap1543, rap2055, rap2173, rap2348, rap2677

Comments:
These *Ceanothus crassifolius-Malosma laurina* stands typically occur in relatively inland, continental settings locally and are not found close to the coast within the summer fog zone. The subdominance of *Malosma laurina* also suggests that winter temperatures are not severe. Most local stands with *Ceanothus crassifolius* have been placed within the mixed *Adenostoma fasciculatum-Ceanothus crassifolius* Alliance.

Phases:
None

COMMON NAME	Hoary Leaf Ceanothus-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus crassifolius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and western Riverside County regions. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
A larger number of samples (n = 23) of this association were taken from a recent study of the vegetation of western Riverside County (Klein and Evens 2005). Below is a summary of the environmental setting:
Elevation: low, range 228–889 m, mean 524 m
Aspect: all aspects (except flat)
Slope: moderate to steep, range 12–45 degrees, mean 29.1 degrees
Topography: undulating or convex, lower to top slopes
Litter Cover: range 4–90%, mean 52.4%
Rock Cover: range 1–45%, mean 19.6%
Bare ground: range 2–85%, mean 24.3%
Parent Material: often metavolcanic, less often gabbro and diorite, sedimentary, mesozoic granite
Soil Texture: often medium to very fine sandy loam, but varies from coarse loamy sand to moderately fine silty clay loam

Vegetation Description:
To supplement the above local description, the following information from Klein and Evens 2005 may be added: *Ceanothus crassifolius* dominates in the shrub layer while *Malosma laurina* and *Adenostoma fasciculatum* are subdominant to codominant. *Salvia mellifera* and *Heteromeles arbutifolia* are characteristically present at low cover.

Comments:
This association is likely to be found in other parts of south coastal California at least as far south as the Mexican border.

References:
Klein and Evens 2005

Ceanothus cuneatus-Quercus berberidifolia Shrubland Association

Wedge Leaf Ceanothus-Scrub Oak Shrubland Association
***Ceanothus cuneatus* Shrubland Alliance**
Wedge Leaf Ceanothus Shrubland Alliance

Mapping Code: 2521

Local Description

Summary:
This shrubland association occurs on somewhat steep northeast- and southeast-facing slopes at low elevations between 226–408 m. It is characterized by *Ceanothus cuneatus* as the dominant shrub with about half as much cover provided by *Quercus berberidifolia*. As with many chaparral association, the herbaceous layer is relatively insignificant in mature stands. The emergent tree layer includes *Quercus agrifolia* and occasional small trees of *Fraxinus dipetala*.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 226–408 m, mean 267 m
Aspect: northeast and southeast
Slope: range 15–35 degrees, mean 24.7 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridgetop
Litter Cover: range 50–50%, mean 50%
Small Rock Cover: range 1–15%, mean 8%
Large Rock Cover: range 0–3%, mean 1.5%
Bare Ground: range 2–25%, mean 13.5%
Parent Material: igneous
Soil Texture: fine clay

Vegetation Description:
Stands of *Ceanothus cuneatus-Quercus berberidifolia* Shrubland form an open to intermittent shrub layer (26–60%, mean 48.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–18%, mean 3.2%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 41–61%, mean cover is 52%.

In this association, the shrub layer is characterized by *Ceanothus cuneatus, Quercus berberidifolia, Adenostoma fasciculatum, Cercocarpus betuloides,* and *Rhus ovata. Heteromeles arbutifolia* is often included in this layer, while *Sambucus mexicana* is occasionally present. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus, Hemizonia fasciculate, Hirschfeldia incana, Centaurea melitensis,* and *Avena fatua*.

***Ceanothus cuneatus-Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.2	1.0	1.0			
Tree Understory									
	FRDI2	*Fraxinus dipetala*	20	0.1	0.2	1.0			
	QUAG-M	*Quercus agrifolia*	20	0.1	0.2	1.0			
Shrub									
	CECU	*Ceanothus cuneatus*	100	24.0	8.0	37.0	X	X	
	QUBE5	*Quercus berberidifolia*	100	10.3	0.2	25.0		X	
	ADFA	*Adenostoma fasciculatum*	100	4.4	0.2	12.0		X	
	CEBE3	*Cercocarpus betuloides*	80	5.4	0.2	21.0		X	
	RHOV	*Rhus ovata*	80	0.7	0.2	2.0		X	
	HEAR5	*Heteromeles arbutifolia*	60	0.5	0.2	2.0			
	SAME5	*Sambucus mexicana*	40	0.2	0.2	1.0			
	CESP	*Ceanothus spinosus*	30	0.4	0.2	4.0			
	SAME3	*Salvia mellifera*	30	0.4	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	30	0.2	0.2	1.0			
	YUWH	*Yucca whipplei*	30	0.1	0.2	1.0			
	MALA6	*Malosma laurina*	20	0.7	3.0	4.0			
	TODI	*Toxicodendron diversilobum*	20	0.1	0.2	1.0			
	PRIL	*Prunus ilicifolia*	20	0.01	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	30	0.1	0.2	1.0			
	HEFA	*Hemizonia fasciculata*	20	1.0	0.2	10.0			
	AVFA	*Avena fatua*	20	0.9	4.0	5.0			X
	CEME2	*Centaurea melitensis*	20	0.3	1.0	2.0			X
	HIIN3	*Hirschfeldia incana*	20	0.2	0.2	2.0			X
	UNGR	Unknown annual grass	20	0.2	0.2	2.0			

Other Noteworthy Species:
None

Nonnative Species:
Avena fatua, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus madritensis

Samples Used in Description: (n = 10)
AA0851, AA1092, rap2140, rap2154, rap2156, rap2158, rap2744, rap2807, rap2811, rap2834

Comments:
A similarly named and potentially synonymous association, *Quercus berberidifolia-Ceanothus cuneatus* tentatively placed in the *Quercus berberidifolia* Alliance (Gordon and White 1994), has been described from the western transverse ranges of southern California. Gordon and White's brief provisional description suggests that both *Q. berberidifolia* and *C. cuneatus* codominate the stands. In the local Santa Monica Mountains setting, *Ceanothus cuneatus* typically dominates, but occasionally *Q. berberidifolia* codominates. It may be that the Santa Monica Mountains represent the lower elevation coastward expression of this broader association that may also occur in the San Gabriel and other mountains of the transverse ranges at somewhat higher elevations.

Phases:
None

COMMON NAME	Wedge Leaf Ceanothus-Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus cuneatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (uncertain alliance affinity)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region; however, it is likely to range somewhat eastward into the western transverse ranges (Gordon and White 1994). Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Gordon and White 1994

Ceanothus megacarpus Shrubland Association

Big Pod Ceanothus Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2081

Local Description

Summary:
This shrubland association occurs on moderate to steep slopes of variable aspect at low elevations between 53–730 m. It is characterized by a strong dominance of *Ceanothus megacarpus* in the shrub layer and an uncharacteristic and insignificant herbaceous layer. The emergent tree layer may include *Quercus agrifolia, Umbellularia californica,* and *Juglans californica*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Western Fog Zone, Eastern Urban, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 53–730 m, mean 361.9 m
Aspect: variable
Slope: range 8–45 degrees, mean 28.8 degrees
Topography (micro; macro): convex, flat, or undulating; lower slope to ridgetop
Litter Cover: range 15-50%, mean 33.8%
Small Rock Cover: range 1–50%, mean 15.3%
Large Rock Cover: range 0–15%, mean 1.9%
Bare Ground: range 0–50%, mean 21.6%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus* Shrubland form an open to continuous shrub layer (16–75%, mean 53.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–8%, mean 0.6%) at 0–2 m tall. Trees are occasionally emergent (0–7% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 19–75%, mean cover is 54.1%.

In this association, the shrub layer is dominated by *Ceanothus megacarpus. Malosma laurin*a is also characteristic but at much lower cover. *Adenostoma fasciculatum* and *Salvia mellifera* are usually included in this layer. The tree layer is emergent and open and can infrequently include *Quercus agrifolia* or *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Marah macrocarpus, Bromus madritensis, Melica imperfecta, Centaurea melitensis, Bromus diandrus,* and *Brassica nigra*.

***Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	44.4	12.0	75.0	X	X	
	MALA6	*Malosma laurina*	89	2.3	0.2	9.0		X	
	ADFA	*Adenostoma fasciculatum*	71	2.1	0.2	12.0			
	SAME3	*Salvia mellifera*	51	0.7	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	44	0.7	0.2	10.0			
	RHOV	*Rhus ovata*	38	0.7	0.2	7.5			
	CEBE3	*Cercocarpus betuloides*	25	0.3	0.2	5.0			
	CESP	*Ceanothus spinosus*	24	0.4	0.2	7.5			
	YUWH	*Yucca whipplei*	24	0.2	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.2	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	21	0.2	0.2	3.0			

Other Noteworthy Species:
Delphinium parryi was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 4 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5, and state rank is S5 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Bromus diandrus, Brassica nigra, Hirschfeldia incana, Avena, Bromus hordeaceus, Cortaderia, Avena fatua, Erodium, Melilotus indicus, Nicotiana glauca

Samples Used in Description: (n = 84)
AA0006cc, AA0041cc, AA0042cc, AA0166cc, AA0172cc, AA0226cc, AA0229cc, AA0232cc, AA0243cc, AA0331cc, AA0337, AA0338, AA0344, AA0359cc, AA0369cc, AA0426, AA0429, AA0431, AA0432, AA0499, AA0500, AA0503, AA0558, AA0599, AA0619, AA0645, AA0670,

AA0698, AA0725, AA0782, AA0784, AA0830, AA0834, AA0888, AA0903, AA0973, AA0983, AA1035, AA1071, AA1076, AA1110, AA1119, AA1123, AA1148, AA1194, AA1195, rap0003, rap0026, rap0027, rap0034, rap0035, rap0037, rap0136, rap0140, rap0147m, rap0150, rap0152, rap0179, rap0197, rap0288, rap0533m, rap0536, rap0546, rap0549, rap0592, rap0599, rap0864m, rap0888, rap1144, rap1206, rap1209, rap1223, rap1267, rap1278, rap1338, rap1468m, rap1485, rap1654, rap1701, rap1730, rap2079, rap2181, rap2329, rap2747

Comments:
In some ways this association forms the ecological core of the chaparral zone in the Santa Monica Mountains. *Ceanothus megacarpus* has its center of distribution in these mountains, and it commonly occurs in dense stands from low to moderate elevations throughout the region. This association is the relatively pure expression of the alliance where on the average *C. megacarpus* provides about 10 times the cover of all other shrub species in these stands. There is little variation in these stands and, hence, no phases have been identified.

Phases:
None

COMMON NAME	Big Pod Ceanothus Shrubland Association
SYNONYM	*Ceanothus megacarpus* Alliance (Borchert et al. 2004), big pod ceanothus chaparral (Holland 1986)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. It is likely to occur somewhat further north and south in south coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This additional information from Borchert et al. 2004 probably largely applies to the *C. megacarpus* Association: The big pod ceanothus alliance is the dominant vegetation type on ocean-facing (south-facing) slopes of the Santa Ynez Mountains. Stands mostly occupy south-

and east-facing, upper and middle slopes between elevations of 482 and 1,023 m. Slopes generally are > 45%.

Vegetation Description:
Based on 14 plots sampled in the Santa Ynez Mountains of Santa Barbara County, Borchert et al. 2004 add this information to the local description above: Big pod ceanothus dominates this alliance with an average cover of 73%. Chamise and holly leaf cherry have constancies > 50% but their average covers are < 10%.

Comments:
See local description.

References:
Borchert et al. 2004, Holland 1986

Ceanothus megacarpus-Adenostoma fasciculatum Shrubland Association

Big Pod Ceanothus-Chamise Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2083

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 0–688 m. It is characterized by the dominance of *Ceanothus megacarpus* and subdominance (averaging about half as much cover) of *Adenostoma fasciculatum* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer may infrequently include *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–688 m, mean 372.9 m
Aspect: variable
Slope: range 15–35 degrees, mean 26 degrees
Topography (micro; macro): undulating, convex, or flat; middle to upper slope
Litter Cover: range 10–65%, mean 41%
Small Rock Cover: range 1–50%, mean 15.5%
Large Rock Cover: range 0–8%, mean 2.8%
Bare Ground: range 10–65%, mean 24.5%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Adenostoma fasciculatum* Shrubland form an open to continuous shrub layer (15–70%, mean 46.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–16%, mean 1.4%) at 0–1 m tall. Trees are occasionally emergent (1–5% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 20–70%, mean cover is 47.3%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Adenostoma fasciculatum,* and *Salvia mellifera. Malosma laurina* and *Heteromeles arbutifolia* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Bromus madritensis, Piptatherum miliaceum, Centaurea melitensis, Bromus diandrus,* and *Leymus condensatus.*

***Ceanothus megacarpus-Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	22.9	6.0	38.0	X		
	ADFA	*Adenostoma fasciculatum*	100	12.9	2.0	30.0	X		
	SAME3	*Salvia mellifera*	77	3.4	0.2	15.0	X		
	MALA6	*Malosma laurina*	68	1.5	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	52	0.5	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	35	0.7	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	35	0.5	0.2	7.5			
	LOSC2	*Lotus scoparius*	35	0.4	0.2	5.0			
	YUWH	*Yucca whipplei*	35	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	29	1.2	0.2	11.0			
	RHOV	*Rhus ovata*	29	0.2	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	23	0.4	0.2	7.0			

Other Noteworthy Species:
Juglans californica was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 2 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Bromus madritensis, Bromus diandrus, Centaurea melitensis, Avena, Brassica nigra, Carduus pycnocephalus, Euphorbia terracina, Lactuca canadensis, Nerium oleander, Brassica, Erodium, Hirschfeldia incana, Melilotus indicus

Samples Used in Description: (n = 31)
AA0054cc, AA0091cc, AA0096cc, AA0288cc, AA0673, AA0708, AA0712, AA0822, AA0857, AA0895, AA0902, AA0921, AA1057, AA1207, rap0006, rap0021m, rap0139, rap0154, rap0159, rap0181, rap0222, rap0285, rap0380, rap0545, rap0586, rap1339, rap1383, rap1492, rap1648, rap1880, rap2666

Comments:
The combination of *C. megacarpus* and *Adenostoma fasciculatum* is a common occurrence in these mountains. Two phases have been identified—one with higher cover and frequency of *Salvia mellifera*.

Phases:
Ceanothus megacarpus-Adenostoma fasciculatum (Big Pod Ceanothus-Chamise) Phase [2083]
Ceanothus megacarpus-Adenostoma fasciculatum-Salvia mellifera (Big Pod Ceanothus-Chamise-Black Sage) Phase [7083]

COMMON NAME	Big Pod Ceanothus-Chamise Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Historically, the balance between the *Adenostoma fasciculatum* (and related *Adenostoma fasciculatum* codominant alliances such as *A. fasciculatum-Salvia mellifera*) and the *Ceanothus megacarpus* Alliance may have been different. Early mapping by the U.S. Forest Service VTM crews (John Tiszler, Robert Taylor personal communication 2003) suggest that in the 1930s the predominant chaparral stands were dominated or codominated by *Adenostoma fasciculatum*. However, currently, Franklin 1998 and current mapping for this project suggest that *C. megacarpus* dominated chaparral has taken over as the principal cover. The interface of these two main dominance types occurs in associations such as this one. Thus, monitoring plots within such stands may afford a more complete understanding of overall trends of vegetation dominance within the area.

References:
Franklin 1998

Ceanothus megacarpus-Adenostoma sparsifolium Shrubland Association

Big Pod Ceanothus-Redshank Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2082

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low to mid elevations between 383–847 m. It is characterized by a dominance of *Ceanothus megacarpus* and a subdominance of *Adenostoma sparsifolium* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer is generally absent but may include *Quercus agrifolia* and *Umbellularia californica*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 383–847 m, mean 640 m
Aspect: variable
Slope: range 15–42 degrees, mean 30.6 degrees
Topography (micro; macro): undulating, convex, or flat; middle slope to ridgetop
Litter Cover: no data
Small Rock Cover: range 5–40%, mean 20%
Large Rock Cover: range 1–18%, mean 6.8%
Bare Ground: range 5–35%, mean 20.6%
Parent Material: igneous
Soil Texture: medium loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Adenostoma sparsifolium* Shrubland form an open to intermittent shrub layer (31–65%, mean 48.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–4%, mean 0.7%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.3%) with hardwoods at 0–15 m tall. Total vegetation cover is 35–65%, mean cover is 49.1%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Adenostoma sparsifolium, Malosma laurina,* and *Adenostoma fasciculatum*. *Salvia mellifera* is often present, and *Rhus ovata* is occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is simple and sometimes includes *Bromus madritensis, Bromus hordeaceus, Centaurea melitensis, Bromus diandrus*, *Avena barbata,* and *Marah macrocarpus.*

***Ceanothus megacarpus-Adenostoma sparsifolium* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	25.7	14.0	52.0	X	X	
	ADSP	*Adenostoma sparsifolium*	100	12.8	5.0	20.0		X	
	MALA6	*Malosma laurina*	80	1.9	0.2	8.0		X	
	ADFA	*Adenostoma fasciculatum*	76	3.9	0.2	15.0		X	
	SAME3	*Salvia mellifera*	60	1.0	0.2	5.0			
	RHOV	*Rhus ovata*	48	0.4	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	40	0.3	0.2	2.5			
	CEBE3	*Cercocarpus betuloides*	36	0.4	0.2	4.0			
	CESP	*Ceanothus spinosus*	32	0.5	0.2	7.0			
	ERFA2	*Eriogonum fasciculatum*	28	0.3	0.2	2.5			
	YUWH	*Yucca whipplei*	28	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	24	0.2	0.2	3.0			
	CEOL	*Ceanothus oliganthus*	20	0.4	1.0	4.0			
	ERCO25	*Eriophyllum confertiflorum*	20	0.1	0.2	1.0			
	LOSC2	*Lotus scoparius*	20	0.01	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	20	0.1	0.2	2.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 4 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Bromus hordeaceus, Avena barbata, Centaurea melitensis, Bromus diandrus, Avena, Erodium cicutarium, Lamarckia aurea

Samples Used in Description: (n = 25)
AA0055cc, AA0563, AA1190, AA1192, AA1203, AA1204, AA1215, AA1218, AA1219, rap0526m, rap0578m, rap0579, rap0581, rap0582, rap0628, rap0786m, rap1488, rap1489, rap1490, rap1493, rap1771, rap1785, rap2423, rap2429, rap2431

Comments:
This association is likely to be largely endemic to the Santa Monica Mountains. Elsewhere, *A. sparsifolium* typically occurs at either more inland localities or at elevations greater than the range of *Ceanothus megacarpus.* Most of these stands occur on northerly facing steep slopes above 600 m. Mature stands tend to have a two-layered canopy with the *A. sparsifolium* projecting 1–3 m above the subcanopy of *C. megacarpus.* More recently burned stands tend to have a relatively even canopy.

Phases:
None

COMMON NAME	Big Pod Ceanothus-Redshank Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus megacarpus-Cercocarpus betuloides Shrubland Association

Big Pod Ceanothus-Birch Leaf Mountain Mahogany Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2084

Local Description

Summary:
This shrubland association occurs on gentle to steep northwest- and northeast-facing slopes at low elevations between 110–701 m. It is characterized by a dominance of *Ceanothus megacarpus* and a subdominance of *Cercocarpus betuloides* in the shrub layer. The herbaceous layer is generally insignificant in mature stands. The emergent tree layer is generally absent but may contain both introduced and native species.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 110–701 m, mean 370.8 m
Aspect: northwest and northeast
Slope: range 2–40 degrees, mean 25.1 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 25–55%, mean 40%
Small Rock Cover: range 5–30%, mean 15.4%
Large Rock Cover: range 0–2%, mean 0.6%
Bare Ground: range 5–35%, mean 20.3%
Parent Material: igneous
Soil Texture: medium to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Cercocarpus betuloides* Shrubland form an open to dense shrub layer (39–65%, mean 51.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–5%, mean 0.7%) at 0–1 m tall. Trees are occasionally emergent (0–16% cover, mean 1.2%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 39–65%, mean cover is 53.1%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Cercocarpus betuloides, Adenostoma fasciculatum,* and *Heteromeles arbutifolia. Malosma laurina* and *Ceanothus spinosus* are often included in this layer. The tree layer is emergent and open and may infrequently include *Umbellularia californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Leymus condensatus, Bromus madritensis,* and *Avena* sp.

***Ceanothus megacarpus-Cercocarpus betuloides* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	27.8	14.0	45.0		X	
	CEBE3	*Cercocarpus betuloides*	88	9.7	0.2	23.0		X	
	ADFA	*Adenostoma fasciculatum*	82	2.4	0.2	5.0		X	
	HEAR5	*Heteromeles arbutifolia*	76	0.4	0.2	2.5		X	
	MALA6	*Malosma laurina*	59	1.1	0.2	5.0			
	CESP	*Ceanothus spinosus*	53	1.2	0.2	7.0			
	SAME3	*Salvia mellifera*	47	0.4	0.2	2.5			
	QUBE5	*Quercus berberidifolia*	41	4.6	0.2	25.0			
	ADSP	*Adenostoma sparsifolium*	35	0.7	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	35	0.4	0.2	3.0			
	RHOV	*Rhus ovata*	35	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	24	0.3	0.2	2.5			
	LOSC2	*Lotus scoparius*	24	0.3	0.2	3.0			
	YUWH	*Yucca whipplei*	24	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	24	0.2	0.2	2.5			

Other Noteworthy Species:
Juglans californica was found in 1of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Avena, Bromus madritensis, Eucalyptus, Bromus hordeaceus, Avena barbata, Bromus diandrus, Centaurea melitensis

Samples Used in Description: (n = 17)
AA0065cc, AA0067cc, AA0402, AA0862, rap0148, rap0236, rap0239m, rap0302, rap0404m, rap0576m, rap0580, rap0590m, rap1653, rap1737, rap2447, rap2500, rap2567

Comments:
This association tends to occur on northerly facing steep slopes where insolation is intermediate between ridges and concave-sheltered slopes. It is likely to be endemic to the Santa Monica Mountains and perhaps other parts of the western transverse ranges of California.

Phases:
None

COMMON NAME Big Pod Ceanothus-Birch Leaf Mountain Mahogany Shrubland Association

SYNONYM None

PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus megacarpus-Malosma laurina Shrubland Association

Big Pod Ceanothus-Laurel Sumac Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2087

Local Description

Summary:
This shrubland association occurs on gentle to very steep slopes of variable aspect at low to mid elevations between 42–780 m. It is characterized by a dominance of *Ceanothus megacarpus* and a subdominance of *Malosma laurina* in the shrub layer. The herbaceous layer is insignificant in older stands. The emergent tree layer is generally absent but can include *Quercus agrifolia*, *Umbellularia californica, Juglans californica, Pinus* sp., and *Eucalyptus* sp.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, Immediate Coast, Simi Hills Inland, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 42–780 m, mean 395.8 m
Aspect: variable
Slope: range 2–50 degrees, mean 29.2 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 15–60%, mean 30%
Small Rock Cover: range 2–55%, mean 19.1%
Large Rock Cover: range 0–15%, mean 2.5%
Bare Ground: range 5–65%, mean 24.6%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Malosma laurina* Shrubland form an open to intermittent shrub layer (23–65%, mean 47.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–10 m tall. The herbaceous layer is open (0–25%, mean 1.6%) at 0–1 m tall. Trees are occasionally emergent (0–9% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 35–65%, mean cover is 49%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus* and *Malosma laurina*. *Adenostoma fasciculatum* and *Heteromeles arbutifolia* are often present, and *Salvia mellifera* is sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Marah macrocarpus, Centaurea melitensis*, *Brassica nigra, Melica imperfecta,* and *Bromus madritensis.*

***Ceanothus megacarpus-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	24.9	7.5	45.0	X		
	MALA6	*Malosma laurina*	100	11.7	2.0	33.0	X		
	ADFA	*Adenostoma fasciculatum*	71	2.7	0.2	13.0			
	HEAR5	*Heteromeles arbutifolia*	66	1.9	0.2	19.0			
	SAME3	*Salvia mellifera*	63	1.8	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	46	0.9	0.2	7.0			
	RHOV	*Rhus ovata*	44	0.6	0.2	6.0			
	CESP	*Ceanothus spinosus*	33	0.8	0.2	8.0			
	YUWH	*Yucca whipplei*	27	0.2	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	26	0.3	0.2	5.0			

Other Noteworthy Species:
Juglans californica was found in 3 of 99 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Nicotiana glauca, Hirschfeldia incana, Bromus diandrus, Avena, Piptatherum miliaceum, Avena fatua, Pennisetum setaceum, Stellaria media, Ageratina adenophora, Eucalyptus, Ailanthus altissima, Avena barbata, Brassica, Carduus pycnocephalus, Galium aparine, Marrubium vulgare, Melilotus, Nerium oleander, Schinus molle

Samples Used in Description: (n=99)
AA0058cc, AA0061cc, AA0062cc, AA0093cc, AA0098cc, AA0136cc, AA0140cc, AA0235cc, AA0270cc, AA0279cc, AA0386, AA0413, AA0416, AA0419, AA0430, AA0483cc, AA0487cc, AA0518, AA0520, AA0553, AA0559, AA0598, AA0639, AA0657, AA0662, AA0692, AA0702, AA0704, AA0715, AA0729, AA0730, AA0788, AA0880, AA0897, AA0917, AA0930, AA0944, AA1005, AA1038, AA1049, AA1053, AA1067, AA1122, AA1173, AA1196, rap0007, rap0196, rap0210, rap0221m, rap0287, rap0294, rap0317, rap0329m, rap0341, rap0343, rap0345, rap0346, rap0356, rap0364m, rap0376, rap0377, rap0413, rap0422, rap0434, rap0552, rap0672, rap0760, rap0775, rap0824, rap0827m, rap0862, rap0953, rap1125, rap1160, rap1163, rap1335, rap1336, rap1381, rap1409m, rap1414, rap1467, rap1519, rap1643, rap1703, rap1734, rap1740, rap2058, rap2098, rap2101, rap2182, rap2192, rap2219, rap2267, rap2368, rap2369, rap2658, rap2780, rap2787, rap2791

Comments:
This is one of the most well sampled and most common associations in the mapping area. It is essentially a mix of two of the most abundant and characteristic shrub species of the study area. It may be broken up into several phases (see below). These are generally based on the degree of codominance or subdominance of other species such as *Adenostoma fasciculatum* with *M. laurina* and *C. megacarpus*.

Phases:
Ceanothus megacarpus-Malosma laurina (Big Pod Ceanothus-Laurel Sumac) Phase [2087]
Ceanothus megacarpus-Malosma laurina-Adenostoma fasciculatum Mixed Chaparral (Big Pod Ceanothus-Laurel Sumac-Chamise Mixed Chaparral) Phase [7081]

COMMON NAME	Big Pod Ceanothus-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to be restricted to the western transverse ranges of southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus megacarpus-Salvia mellifera Shrubland Association

Big Pod Ceanothus-Black Sage Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 7085

Local Description

Summary:
This shrubland association occurs on gentle to very steep southwest- and southeast-facing slopes at low elevations between 49–636 m. It is characterized by *Ceanothus megacarpus* as a dominant and *Salvia mellifera* as a subdominant in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer is largely absent in most stands.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, Simi Hills Inland, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 49–636 m, mean 322.7 m
Aspect: southwest and southeast
Slope: range 2–55 degrees, mean 31.3 degrees
Topography (micro; macro): variable (all); middle slope to ridgetop
Litter Cover: range 10–55%, mean 26.7%
Small Rock Cover: range 0–75%, mean 25.8%
Large Rock Cover: range 0–15%, mean 3.5%
Bare Ground: range 0–70%, mean 22.8%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Salvia mellifera* Shrubland form an open to intermittent shrub layer (21–62%, mean 38.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–15%, mean 2.9%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 0.3%) with hardwoods at 0–15 m tall. Total vegetation cover is 25–65%, mean cover is 42.2%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Malosma laurina,* and *Salvia mellifera. Eriogonum fasciculatum, Eriogonum cinereum, Yucca whipplei,* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Bromus madritensis, Melica imperfecta, Leymus condensatus,* and *Brassica nigra*.

***Ceanothus megacarpus-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	12.4	3.0	35.0	X	X	
	MALA6	*Malosma laurina*	93	7.8	0.2	20.0		X	
	SAME3	*Salvia mellifera*	83	5.9	0.2	20.0		X	
	ERFA2	*Eriogonum fasciculatum*	57	3.1	0.2	20.0			
	ERCI5	*Eriogonum cinereum*	55	2.7	0.2	15.0			
	YUWH	*Yucca whipplei*	55	0.4	0.2	2.5			
	ADFA	*Adenostoma fasciculatum*	52	0.8	0.2	3.0			
	ARCA11	*Artemisia californica*	41	1.1	0.2	12.0			
	RHOV	*Rhus ovata*	41	0.9	0.2	8.0			
	HEAR5	*Heteromeles arbutifolia*	40	1.0	0.2	15.0			
	ENCA	*Encelia californica*	38	1.2	0.2	15.0			
	CESP	*Ceanothus spinosus*	22	0.4	0.2	5.0			
	LOSC2	*Lotus scoparius*	22	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	21	0.4	0.2	8.0			
	MAFA	*Malacothamnus fasciculatus*	21	0.3	0.2	6.0			
Herb									
	CEME2	*Centaurea melitensis*	24	0.3	0.2	2.5			X
	BRMA3	*Bromus madritensis*	22	0.4	0.2	10.0			X

Other Noteworthy Species:
Juglans californica was found in 5 of 58 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Brassica nigra, Bromus diandrus, Avena barbata, Avena, Hirschfeldia incana, Avena fatua, Piptatherum miliaceum, Bromus hordeaceus, Nicotiana glauca, Erodium cicutarium, Foeniculum vulgare, Marrubium vulgare, Schinus molle, Ageratina adenophora, Brassica, Galium aparine, Lobularia maritima, Pennisetum setaceum, Stellaria media

Samples Used in Description: (n = 58)
AA0005cc, AA0071cc, AA0097cc, AA0132cc, AA0135cc, AA0137cc, AA0251cc, AA0284cc, AA0290cc, AA0345, AA0368cc, AA0418, AA0513, AA0620, AA0693, AA0714, AA0728, AA0937, AA1078, AA1109, rap0008, rap0031, rap0111, rap0121, rap0149m, rap0151, rap0183m, rap0217, rap0292, rap0312, rap0387m, rap0469, rap0548, rap0766, rap0809, rap0833, rap0835, rap1187, rap1211, rap1213m, rap1221, rap1304m, rap1357, rap1384, rap1385, rap1410, rap1412, rap1413, rap1508m, rap1709, rap1738, rap1743, rap2125, rap2190, rap2488, rap2499m, rap2606, rap2748

Comments:
Stands of this association occur on hot, dry southerly facing slopes throughout the study area. Both main shrub species are unlikely to form an association outside the western transverse ranges of Santa Barbara, Ventura, and Los Angeles counties.

Phases:
None

COMMON NAME	Big Pod Ceanothus-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Both main shrub species are unlikely to form an association outside the western transverse ranges of Santa Barbara, Ventura, and Los Angeles counties.

References:
None

Ceanothus oliganthus Shrubland Association

Hairy Leaf Ceanothus Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2072

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low to mid elevations between 498–847 m. It is characterized by a strong dominance of *Ceanothus oliganthus* in the shrub layer, although a variety of other shrubs may occur occasionally at low cover. The emergent tree layer occasionally includes *Quercus agrifolia* and *Umbellularia californica*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 498–847 m, mean 719.8 m
Aspect: variable
Slope: range 3–35 degrees, mean 22.8 degrees
Topography (micro; macro): flat, concave, or undulating; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 3–30%, mean 15.3%
Large Rock Cover: range 0–20%, mean 7.7%
Bare Ground: range 10–32%, mean 18.7%
Parent Material: igneous
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Ceanothus oliganthus* Shrubland form an intermittent to continuous shrub layer (36–65%, mean 55.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 2–5 m tall. The herbaceous layer is bare. Trees are occasionally emergent (0–12% cover, mean 3.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 48–65%, mean cover is 58.8%.

In this association, the shrub layer is dominated by *Ceanothus oliganthus. Heteromeles arbutifolia* is also characteristic, but at lower cover. *Adenostoma sparsifolium* and *Quercus berberidifolia* are often present, and *Ceanothus megacarpus* is sometimes included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia and Umbellularia californica* at low cover. The herbaceous layer is simple and occasionally includes *Avena barbata, Bromus diandrus,* and *Bromus hordeaceus.*

***Ceanothus oliganthus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	50	1.4	1.0	7.0	X		
	UMCA-T	*Umbellularia californica*	20	0.2	1.0	1.0			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	20	1.0	5.0	5.0			
	UMCA-M	*Umbellularia californica*	20	0.7	2.0	5.0			
Shrub									
	CEOL	*Ceanothus oliganthus*	100	44.6	21.0	58.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	90	1.7	0.2	7.0		X	
	ADSP	*Adenostoma sparsifolium*	70	2.6	1.0	8.0			
	QUBE5	*Quercus berberidifolia*	60	1.2	0.2	5.0			
	CEME	*Ceanothus megacarpus*	40	0.4	0.2	2.5			
	ADFA	*Adenostoma fasciculatum*	30	0.3	0.2	3.0			
	RHOV	*Rhus ovata*	30	0.2	0.2	1.0			
	GAVE2	*Garrya veatchii*	30	0.1	0.2	1.0			
	LEFR	*Lepechinia fragrans*	30	0.1	0.2	0.2			
	LULO	*Lupinus longifolius*	20	1.5	0.2	15.0			
	CECR	*Ceanothus crassifolius*	20	0.6	0.2	6.0			
	ARGL3	*Arctostaphylos glandulosa*	20	0.4	0.2	4.0			
	MIAU	*Mimulus aurantiacus*	20	0.4	0.2	4.0			
	PRIL	*Prunus ilicifolia*	20	0.2	0.2	2.0			
	DERI	*Dendromecon rigida*	20	0.2	1.0	1.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.1	0.2	1.0			
	ARCTO3	*Arctostaphylos*	20	0.01	0.2	0.2			
	RIMA	*Ribes malvaceum*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Lepechinia fragrans was found in 3 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis

Samples Used in Description: (n = 10)
AA0056cc, AA0819, rap0265, rap0778m, rap0779m, rap0783, rap0787m, rap0789m, rap0796m, rap2382

Comments:
Ceanothus oliganthus in southern California tends to be a montane species. In the study area, it may be considered as an upper-elevation analog to *Ceanothus spinosus*, replacing it largely above 700 m. It is an obligate seeder and tends to senesce after about three to four decades (Borchert et al. 2004). This association is more common at lower elevations in the Simi Hills than in the main portion of the Santa Monica Mountains.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in a number of areas from Monterey County to San Diego County but has not been adequately treated at the association level to determine its full extent.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Klein and Evens 2005, Evens and San 2005, and Borchert et al. 2004 have reported on stands of *Ceanothus oliganthus* that resemble these relatively pure stands in the SAMO study area. However, they have not had the sufficient number of stands to further differentiate their examples at the association level. Recent sampling in the peninsular ranges of San Diego County (Keeler-Wolf personal observation 2005) suggests there are other early seral postfire *Ceanothus oliganthus* associations, which may occur in mixed coniferous forests up to 1,800 m in association with emergent *Quercus chrysolepis* and *Pinus coulteri*.

References:
Borchert et al. 2004, Evens and San 2005, Klein and Evens 2005

Ceanothus oliganthus-Adenostoma sparsifolium Shrubland Association

Hairy Leaf Ceanothus-Redshank Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2078

Local Description

Summary:
This shrubland association occurs on moderate to steep northwest- to southeast-facing slopes at low to mid elevations between 621–879 m. It is characterized by a codominance of *Ceanothus oliganthus* and *Adenostoma sparsifolium* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer includes *Quercus agrifolia.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 621–879 m, mean 744.8 m
Aspect: northwest to southeast
Slope: range 7–35 degrees, mean 22.5 degrees
Topography (micro; macro): variable (all); middle slope to ridgetop
Litter Cover: range 25–75%, mean 48.8%
Small Rock Cover: range 4–45%, mean 18.2%
Large Rock Cover: range 0–15%, mean 4.2%
Bare Ground: range 10–45%, mean 20.6%
Parent Material: igneous
Soil Texture: medium loam

Vegetation Description:
Stands of *Ceanothus oliganthus-Adenostoma sparsifolium* Shrubland form an intermittent shrub layer (38–65%, mean 50.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–2%, mean 0.4%) at 0–1 m tall. Trees are occasionally emergent (0–7% cover, mean 1.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 38–65%, mean cover is 51.9%.

In this association, the shrub layer is characterized by *Adenostoma sparsifolium* and *Ceanothus oliganthus. Adenostoma fasciculatum* are usually present, while *Ceanothus megacarpus, Quercus berberidifolia,* and *Lepechinia fragrans* are occasionally included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Marah macrocarpus, Bromus madritensis*, *Melica imperfecta,* and *Leymus condensatus.*

***Ceanothus oliganthus-Adenostoma sparsifolium* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	35	0.6	0.2	5.0			
Shrub									
	ADSP	*Adenostoma sparsifolium*	100	17.3	5.0	38.0	X		
	CEOL	*Ceanothus oliganthus*	96	17.0	2.0	35.0	X		
	ADFA	*Adenostoma fasciculatum*	61	1.0	0.2	7.0			
	CEME	*Ceanothus megacarpus*	57	4.0	0.2	16.0			
	QUBE5	*Quercus berberidifolia*	48	1.6	0.2	17.0			
	LEFR	*Lepechinia fragrans*	48	1.3	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	43	0.7	0.2	10.0			
	CEBE3	*Cercocarpus betuloides*	39	2.2	0.2	20.0			
	SAME3	*Salvia mellifera*	39	0.4	0.2	2.0			
	HEAR5	*Heteromeles arbutifolia*	35	0.5	0.2	6.0			
	RHOV	*Rhus ovata*	35	0.3	0.2	2.5			
	CECR	*Ceanothus crassifolius*	30	1.3	0.2	10.0			
	MALA6	*Malosma laurina*	26	1.0	0.2	18.0			
	ARGL3	*Arctostaphylos glandulosa*	26	0.4	1.0	2.5			
	PRIL	*Prunus ilicifolia*	22	1.0	0.2	16.0			
	RHIL	*Rhamnus ilicifolia*	22	0.1	0.2	1.0			
	RIMA	*Ribes malvaceum*	22	0.1	0.2	1.0			

Other Noteworthy Species:
Lepechinia fragrans was found in 11 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Piptatherum miliaceum, Brassica nigra, Bromus hordeaceus, Bromus diandrus

Samples Used in Description: (n = 23)
AA0205cc, AA0915, AA1199, rap0262, rap0309m, rap0540, rap0616, rap0773, rap0774, rap0780, rap0788m, rap0797, rap0798, rap1491, rap1536, rap1773, rap1780, rap1783, rap1820, rap2400, rap2424, rap2800, rap2935

Comments:
Although both *A. sparsifolium* and *C. oliganthus* codominate in these stands, the ecological relationships borne out in the cluster analysis suggest this association should be classified within the *Ceanothus oliganthus* Alliance and not the *Adenostoma sparsifolium* Alliance. This is likely to be an endemic association to the Santa Monica Mountains. No other reports of this type have been alluded to in other studies of southern California chaparral. The Boney Ridge area of the high west-central portion of the study area appears to be the stronghold for this association. This is generally the only portion of the study area where elevations are high enough to support both of the characteristic species of this association. At lower elevation, *Ceanothus oliganthus* can be replaced by *Ceanothus spinosus*.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus-Redshank Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description

References:
None

Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata Shrubland Association

Hairy Leaf Ceanothus-Toyon Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2076

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 336–677 m. It is characterized by the dominance of *Ceanothus oliganthus* and subdominance of *Heteromeles arbutifolia* in the shrub layer. The herbaceous layer is generally sparse. The emergent tree layer includes occasional *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Simi Hills, Inland Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 336–677 m, mean 506 m
Aspect: northeast and northwest
Slope: range 15–35 degrees, mean 30.7 degrees
Topography (micro; macro): undulating or concave; lower to upper slope
Litter Cover: no data
Small Rock Cover: 5%
Large Rock Cover: no data
Bare Ground: 10%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata* Shrubland form an intermittent shrub layer (38–60%, mean 51.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–20%, mean 2.9%) at 0–1 m tall. Trees are occasionally emergent (0–12% cover, mean 2.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 45–63%, mean cover is 57%.

In this association, the shrub layer is characterized by *Ceanothus oliganthus*, *Heteromeles arbutifolia, Adenostoma fasciculatum,* and *Rhus ovata. Malosma laurina* and *Ceanothus crassifolius* are often included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus, Marah macrocarpus*, *Delphinium cardinale,* and *Bromus madritensis.*

***Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	50	1.4	0.2	7.0	X		
	JUCA-T	*Juglans californica*	21	0.7	1.0	5.0			
Shrub									
	CEOL	*Ceanothus oliganthus*	100	26.2	15.0	42.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	86	7.2	0.2	15.0		X	
	ADFA	*Adenostoma fasciculatum*	79	5.5	0.2	15.0		X	
	RHOV	*Rhus ovata*	79	4.6	1.0	13.0		X	
	CECR	*Ceanothus crassifolius*	57	1.4	1.0	4.0			
	MALA6	*Malosma laurina*	57	1.3	0.2	6.0			
	CEBE3	*Cercocarpus betuloides*	43	2.1	2.0	9.0			
	SAME3	*Salvia mellifera*	36	1.0	0.2	8.0			
	PRIL	*Prunus ilicifolia*	36	0.8	0.2	4.0			
	SAME5	*Sambucus mexicana*	36	0.3	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	21	0.7	2.0	4.0			
	QUBE5	*Quercus berberidifolia*	21	0.7	0.2	8.0			
Herb									
	LECO12	*Leymus condensatus*	21	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 4 of 14 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Ailanthus altissima, Bromus madritensis, Centaurea melitensis, Robinia

Samples Used in Description: (n = 14)
AA0033cc, AA0294cc, rap0246, rap1452, rap2056, rap2093m, rap2094, rap2175m, rap2228m, rap2335, rap2356, rap2405, rap2406, rap2649

Comments:
This is the most widespread of the *Ceanothus oliganthus* associations in the study area. It is more common in the Simi Hills region but also occurs at upper elevations in the main portion of the Santa Monica Mountains. It can be considered as the mesic expression of this alliance between the relatively xeric *C. oliganthus-A. sparsifolium* and the more mesophytic *C. oliganthus-Quercus berberidifolia* associations in moisture relations.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus-Toyon Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is only known so far from the SAMO study area but may occur elsewhere in central or south-coastal California.

References:
None

Ceanothus oliganthus-Quercus berberidifolia Shrubland Association

Hairy Leaf Ceanothus-Scrub Oak Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2077

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and northwest-facing slopes at low elevations between 332–729 m. It is characterized by a codominance of *Ceanothus oliganthus* and *Quercus berberidifolia* in the shrub layer. The herbaceous layer is sparse and insignificant. The emergent tree layer occasionally includes *Quercus agrifolia.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 332–729 m, mean 663.5 m
Aspect: northeast and northwest
Slope: range 4–35 degrees, mean 18.3 degrees
Topography (micro; macro): convex or flat; bottom to middle slope
Litter Cover: range 2–80%, mean 50.5%
Small Rock Cover: range 2–10%, mean 5.1%
Large Rock Cover: range 0–85%, mean 12.8%
Bare Ground: range 2–35%, mean 17%
Parent Material: quaternary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus oliganthus-Quercus berberidifolia* Shrubland form an open to intermittent shrub layer (10–65%, mean 49.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–5%, mean 0.8%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 1.2%) with hardwoods at 0–15 m tall. Total vegetation cover is 12–65%, mean cover is 50.3%.

In this association, the shrub layer is characterized by *Ceanothus oliganthus. Quercus berberidifolia, Adenostoma fasciculatum, Arctostaphylos glandulosa,* and *Heteromeles arbutifolia* are often present, and *Cercocarpus betuloides* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Bromus diandrus, Piptatherum miliaceum*, and *Centaurea melitensis.*

***Ceanothus oliganthus-Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	25	0.2	0.2	1.0			
Shrub									
	CEOL	*Ceanothus oliganthus*	100	19.1	2.5	48.0	X	X	
	QUBE5	*Quercus berberidifolia*	100	12.0	2.5	32.0		X	
	ADFA	*Adenostoma fasciculatum*	92	3.3	0.2	13.0		X	
	ARGL3	*Arctostaphylos glandulosa*	75	2.2	0.2	12.0		X	
	HEAR5	*Heteromeles arbutifolia*	75	1.8	0.2	8.0		X	
	CEME	*Ceanothus megacarpus*	50	2.8	1.0	14.0			
	CEBE3	*Cercocarpus betuloides*	50	1.1	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	42	1.1	0.2	6.0			
	RHOV	*Rhus ovata*	42	0.4	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	33	1.8	0.2	13.0			
	DERI	*Dendromecon rigida*	33	0.9	1.0	8.0			
	LOSC2	*Lotus scoparius*	33	0.3	0.2	2.0			
	GAVE2	*Garrya veatchii*	33	0.2	0.2	1.0			
	CELE2	*Ceanothus leucodermis*	25	0.9	0.2	10.0			
	ADSP	*Adenostoma sparsifolium*	25	0.8	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	25	0.3	0.2	3.0			
	CECR	*Ceanothus crassifolius*	25	0.2	0.2	2.0			
	HASQ2	*Hazardia squarrosa*	25	0.1	0.2	1.0			
Herb									
	BRDI3	*Bromus diandrus*	42	0.1	0.2	0.2			X
	CEME2	*Centaurea melitensis*	25	0.1	0.2	0.2			X
	PIMI3	*Piptatherum miliaceum*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is G2 CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Lepechinia fragrans was found in 2 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Piptatherum miliaceum, Eucalyptus, Spartium junceum, Bromus hordeaceus, Brassica nigra, Schinus molle, Avena, Avena barbata, Bromus madritensis, Foeniculum vulgare, Galium aparine, Lolium, Marrubium vulgare, Phoenix canariensis

Samples Used in Description: (n = 12)
AA0163cc, rap0260, rap0271m, rap0272, rap0280m, rap0281, rap0283, rap0307m, rap0627, rap1656, rap1657m, rap2242

Comments:
This association, only known from the SAMO study area, may be the most mesic expression of this alliance. It is restricted to moist northerly facing slopes and generally occurs on lower portions of the slopes.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus-Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely that this association may occur elsewhere particularly northward into the central coast ranges of California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus spinosus Shrubland Association

Greenbark Ceanothus Shrubland Association
***Ceanothus spinosus* Shrubland Alliance**
Greenbark Ceanothus Shrubland Alliance

Mapping Code: 2092

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep northeast- and northwest-facing slopes at low elevations between 0–692 m. It is characterized by a strong dominance of *Ceanothus spinosus* in the shrub layer and may include a wide variety of mesophytic species in the herbaceous layer, none apparently in high constancy. The emergent tree layer includes *Quercus agrifolia* and *Juglans californica.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–692 m, mean 385.5 m
Aspect: northeast and northwest
Slope: range 10–48 degrees, mean 29.8 degrees
Topography (micro; macro): concave, convex, or flat; lower to upper slope
Litter Cover: range 25–70%, mean 51.4%
Small Rock Cover: range 0–35%, mean 9.9%
Large Rock Cover: range 0–15%, mean 1.6%
Bare Ground: range 0–75%, mean 18.2%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus spinosus* Shrubland form an open to continuous shrub layer (10–68%, mean 53.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–10 m tall. The herbaceous layer is open to intermittent (0–57%, mean 3.4%) at 0–2 m tall. Trees are occasionally emergent (0–45% cover, mean 2%) with conifers at 0–10 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 38–70%, mean cover is 58.1%.

In this association, the shrub layer is dominated by *Ceanothus spinosus. Heteromeles arbutifolia* is also characteristic but at lower cover. *Malosma laurina* and *Ceanothus megacarpus* are often present, while *Rhus ovata* is occasionally included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia, Juglans californica,* and *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Marah macrocarpus, Melica imperfecta,* and *Bromus diandrus.*

***Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	37	0.8	0.2	5.0			
	JUCA-T	*Juglans californica*	24	0.5	0.2	7.0			
Shrub									
	CESP	*Ceanothus spinosus*	100	39.2	5.0	65.0	X		
	HEAR5	*Heteromeles arbutifolia*	79	3.1	0.2	20.0	X		
	MALA6	*Malosma laurina*	60	2.6	0.2	26.0			
	CEME	*Ceanothus megacarpus*	51	1.5	0.2	9.0			
	RHOV	*Rhus ovata*	49	1.2	0.2	25.0			
	PRIL	*Prunus ilicifolia*	40	1.6	0.2	20.0			
	CEBE3	*Cercocarpus betuloides*	34	0.6	0.2	11.0			
	MIAU	*Mimulus aurantiacus*	33	0.7	0.2	7.5			
	ADFA	*Adenostoma fasciculatum*	26	0.5	0.2	9.0			
	SAME5	*Sambucus mexicana*	22	0.2	0.2	6.0			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 42 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 6 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Brassica nigra, Nicotiana glauca, Senecio mikanioides, Carduus pycnocephalus, Bromus madritensis, Avena, Bromus hordeaceus, Galium aparine, Hirschfeldia incana, Avena fatua, Piptatherum miliaceum, Stellaria media, Schinus molle, Eucalyptus, Avena barbata, Briza maxima, Foeniculum vulgare, Medicago polymorpha, Melilotus indicus, Ricinus communis, Sonchus oleraceus

Samples Used in Description: (n = 134)
AA0027cc, AA0052cc, AA0063cc, AA0090cc, AA0131cc, AA0170cc, AA0171cc, AA0201cc, AA0202cc, AA0210cc, AA0214cc, AA0217cc, AA0239cc, AA0269cc, AA0311cc, AA0333, AA0425, AA0433, AA0436, AA0441, AA0456cc, AA0551, AA0556, AA0611, AA0631, AA0635, AA0642, AA0705, AA0811, AA0812, AA0836, AA0855, AA0876, AA0878, AA0894, AA0918,

AA0924, AA0938, AA0945, AA0992, AA1006, AA1025, AA1036, AA1046, AA1054, AA1073, AA1079, AA1112, AA1131, AA1138, AA1143, AA1154, AA1184, rap0013m, rap0018m, rap0130, rap0156, rap0232, rap0233m, rap0253, rap0256, rap0318m, rap0325, rap0328m, rap0332m, rap0348, rap0351, rap0373, rap0405, rap0408, rap0426m, rap0427, rap0450, rap0456, rap0471m, rap0473m, rap0477, rap0478, rap0497, rap0501, rap0534, rap0537m, rap0538, rap0566, rap0573, rap0589, rap0594, rap0635m, rap0681m, rap0765, rap0767, rap0768, rap1175, rap1225, rap1227, rap1232, rap1237, rap1255, rap1256m, rap1287, rap1341, rap1371, rap1486, rap1494, rap1516, rap1520, rap1569, rap1584, rap1587, rap1622m, rap1623m, rap1646, rap1700, rap1704, rap1739, rap2078, rap2135, rap2143m, rap2163, rap2342, rap2385, rap2399, rap2443, rap2444, rap2589, rap2599, rap2607, rap2693, rap2694, rap2717, rap2723, rap2782, rap2810, rap2934

Comments:
This is an abundant association in the study area. Although typical of concave north-facing slopes at mid and lower elevations, it may also occur on drier exposures closer to the coast where summer fog may ameliorate evapotranspiration. This relatively tall, arborescent chaparral association often occurs adjacent to stands of *Quercus agrifolia, Juglans californica*, or even riparian woodlands, suggesting a relatively high moisture regime. Three phases have been identified that suggests relatively more (*Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia)* or less *(Ceanothus spinosus-Malosma laurina*) mesic settings. The association with *Malosma laurina* may also indicate increased fire frequency.

Phases:
Ceanothus spinosus (Greenbark Ceanothus) Phase [2092]
Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia (Greenbark Ceanothus-Toyon-Holly Leaf Cherry) Phase [2094]
Ceanothus spinosus-Malosma laurina (Greenbark Ceanothus-Laurel Sumac) Phase [2097]

COMMON NAME	Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus spinosus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Based on the similarities of this association with the alliance description in Borchert et al. 2004, we can extrapolate the following from their general description and state: The greenbark ceanothus alliance is prominent on north-facing slopes, although it also occurs on ocean-facing slopes. Most stands occupy mesic (solar insolation < 200), moderately steep (> 50%) slopes on a variety of exposures, although north-facing aspects are most common.

Vegetation Description:
The following information has been excerpted from Borchert et al. 2004 in their description of the alliance in the Santa Ynez Mountains: Although greenbark ceanothus clearly dominates this alliance, holly leaf cherry *(Prunus ilicifolia)* and toyon *(Heteromeles arbutifolia)* are almost always associated with it, indicating that these species form a plant association within the greenbark ceanothus alliance. Co-occurring species in this alliance may be different on ocean-facing slopes of the Santa Ynez Mountains.

Comments:
Based on the comments of Borchert et al. 2004, it is likely that this association is the principal one found in the Santa Monica Mountains and in the Santa Ynez Mountains to the north and west of this study area. Although *Heteromeles arbutifolia* is a common associate of this association, it was not found to be a strong enough indicator to warrant an entire association. A *Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia* phase of this association has been identified, which is analogous to the situation described by Borchert et al. 2004 above.

References:
Borchert et al. 2004

Ceanothus spinosus-Ceanothus megacarpus Shrubland Association

Greenbark Ceanothus-Big Pod Ceanothus Shrubland Association
***Ceanothus spinosus* Shrubland Alliance**
Greenbark Ceanothus Shrubland Alliance

Mapping Code: 2091

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northeast- and northwest-facing slopes at low elevations between 0–749 m. It is characterized by a codominance of *Ceanothus spinosus* and *C. megacarpus* in the shrub layer. The herbaceous layer is diverse but has no constant indicators and generally provides little cover. The emergent tree layer includes occasional *Quercus agrifolia* and *Juglans californica.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–749 m, mean 395 m
Aspect: northeast and northwest
Slope: range 10–40 degrees, mean 32.9 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 25–60%, mean 48.3%
Small Rock Cover: range 5–45%, mean 14.9%
Large Rock Cover: range 0–7%, mean 2.2%
Bare Ground: range 7–45%, mean 21%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus spinosus-Ceanothus megacarpus* Shrubland form an open to continuous shrub layer (32–66%, mean 53.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–25%, mean 1.7%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 1.5%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 40–67%, mean cover is 56.2%.

In this association, the shrub layer is characterized by *Ceanothus spinosus, Ceanothus megacarpus,* and *Malosma laurina*. *Heteromeles arbutifolia* is often present, and *Rhus ovata* is occasionally included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Melica imperfecta, Leymus condensatus, Brassica nigra, Marah macrocarpus,* and *Bromus madritensis.*

***Ceanothus spinosus-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	0.9	0.2	10.0			
Shrub									
	CESP	*Ceanothus spinosus*	100	22.7	5.0	50.0	X	X	
	CEME	*Ceanothus megacarpus*	100	18.8	5.0	45.0	X	X	
	MALA6	*Malosma laurina*	78	3.2	0.2	12.0		X	
	HEAR5	*Heteromeles arbutifolia*	70	2.9	0.2	16.0			
	RHOV	*Rhus ovata*	41	0.7	0.2	7.0			
	ADFA	*Adenostoma fasciculatum*	37	0.7	0.2	7.0			
	MIAU	*Mimulus aurantiacus*	33	0.7	0.2	5.0			
	PRIL	*Prunus ilicifolia*	28	0.5	0.2	5.0			
	SAME3	*Salvia mellifera*	26	0.8	0.2	12.0			
	CEBE3	*Cercocarpus betuloides*	26	0.5	0.2	8.0			

Other Noteworthy Species:
Juglans californica was found in 12 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Nicotiana glauca, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Foeniculum vulgare, Centaurea melitensis, Piptatherum miliaceum, Eucalyptus, Bromus diandrus, Erodium, Bromus hordeaceus, Senecio mikanioides, Avena, Ageratina adenophora, Conyza canadensis, Erodium cicutarium, Malva parviflora, Marrubium vulgare

Samples Used in Description: (n = 54)
AA0025cc, AA0094cc, AA0203cc, AA0227cc, AA0258cc, AA0340, AA0348, AA0457cc, AA0632, AA0644, AA0661, AA0663, AA0706, AA0734, AA0831, AA0865, AA0889, AA0925, AA1140, AA1205, rap0017m, rap0122, rap0153m, rap0184, rap0216m, rap0224m, rap0230m, rap0237m, rap0296m, rap0315, rap0316, rap0353, rap0598m, rap0615, rap0817, rap0823m, rap0825m, rap0929, rap0952, rap1289, rap1379, rap1382, rap1406, rap1575, rap1576, rap1577m, rap1650, rap1879, rap2103, rap2343, rap2345, rap2346, rap2486, rap2667

Comments:
In this association, the two principal members of the two main chaparral alliances endemic to the western transverse ranges comingle. Because *C. megacarpus* is typical of relatively xeric settings and *C. spinosus* is conversely typical of mesic settings, it stands to reason that this mixing of the two species falls in between. Thus, although the stands of this association tend to occur on northerly facing slopes, they usually occur on the upper slopes, toward the ridges and on minor convexities. Either species of *Ceanothus* may dominate with more than twice the cover of the other, although *C. spinosus* is more frequently dominant.

Phases:
None

COMMON NAME	Greenbark Ceanothus-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus spinosus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Cercocarpus betuloides Shrubland Association

Birch Leaf Mountain Mahogany Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2114

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northeast- and northwest-facing slopes at low elevations between 10–661 m. It is characterized by a dominance of *Cercocarpus betuloides* in the shrub layer. The herbaceous layer has no characteristic species. The emergent tree layer may include infrequent *Quercus agrifolia, Juglans californica, Platanus racemosa,* and *Umbellularia californica*.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 10–661 m, mean 233.5 m
Aspect: northeast and northwest
Slope: range 8–8 degrees, mean 31.3 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 55–65%, mean 59.3%
Small Rock Cover: range 0–15%, mean 8.8%
Large Rock Cover: range 0–12%, mean 3.4%
Bare Ground: range 0–55%, mean 19.7%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Cercocarpus betuloides* Shrubland form an open to continuous shrub layer (16–68%, mean 46.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–28%, mean 4%) at 0–2 m tall. Trees are occasionally emergent (0–7% cover, mean 0.8%) with hardwoods at 0–10 m tall. Total vegetation cover is 37–70%, mean cover is 51.1%.

In this association, the shrub layer is dominated by *Cercocarpus betuloides. Heteromeles arbutifolia* is also characteristic but at lower cover. *Malosma laurina* is often present, while *Ceanothus spinosus* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Melica imperfecta, Marah macrocarpus, Phacelia* sp., *Nassella* sp., and *Bromus diandrus.*

***Cercocarpus betuloides* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEBE3	*Cercocarpus betuloides*	100	31.8	12.0	65.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	76	3.1	0.2	15.0		X	
	MALA6	*Malosma laurina*	52	1.0	0.2	7.0			
	CESP	*Ceanothus spinosus*	50	1.5	0.2	12.0			
	CEME	*Ceanothus megacarpus*	43	1.0	0.2	8.0			
	ADFA	*Adenostoma fasciculatum*	40	1.1	0.2	16.0			
	MIAU	*Mimulus aurantiacus*	36	1.1	0.2	8.0			
	SAME3	*Salvia mellifera*	36	0.8	0.2	6.0			
	ARCA11	*Artemisia californica*	33	0.5	0.2	5.0			
	PRIL	*Prunus ilicifolia*	31	0.5	0.2	5.0			
	RHOV	*Rhus ovata*	29	0.5	0.2	5.0			
	SAME5	*Sambucus mexicana*	29	0.3	0.2	4.0			
Herb									
	LECO12	*Leymus condensatus*	38	1.0	0.2	10.0			

Other Noteworthy Species:
Calochortus plummerae was found in 1 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 5 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Woodwardia fimbriata was found in 2 of 42 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Bromus hordeaceus, Centaurea melitensis, Avena fatua, Bromus madritensis, Piptatherum miliaceum, Hirschfeldia incana, Avena barbata, Capsella bursa-pastoris, Carduus pycnocephalus, Erodium, Malva parviflora, Nicotiana glauca, Ricinus communis, Stellaria media, Ageratina adenophora, Bromus tectorum, Cistus, Galium aparine, Marrubium vulgare

Samples Used in Description: (n = 42)
AA0141cc, AA0408, AA0435, AA0711, AA0716, AA0719, AA0901, AA0927, AA1022, AA1029, AA1091, AA1162, AA1191, AA1214, rap0127, rap0369, rap0676, rap0716, rap0718, rap0724, rap0754m, rap1030, rap1031, rap1105m, rap1252, rap1651m, rap1663, rap1664, rap1762m,

rap1855, rap1857m, rap1859, rap2139, rap2141, rap2142, rap2408m, rap2551, rap2620, rap2671, rap2690, rap2802, rap2909

Comments:
This is the most widespread of the four associations of *Cercocarpus betuloides* in the study area. It is often found on steep, usually upper northerly facing slopes.

Phases:
None

COMMON NAME	Birch Leaf Mountain Mahogany Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains and western Riverside County (Klein and Evens 2005). Information about its global distribution is not available without additional inventory; however, it is likely to occur more widely throughout California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
Cercocarpus betuloides is usually the dominant species in the shrub overstory. A variety of shrubs consistently intermix as subdominants including *Heteromeles arbutifolia*, *Ceanothus crassifolius*, *Rhamnus ilicifolia*, *Prunus ilicifolia*, and *Salvia mellifera*. Other species that commonly occur at low cover include the shrub *Adenostoma fasciculatum* and herb *Dudleya pulverulenta* (in western Riverside County).

Comments:
This association appears to be widespread throughout coastal California and may also range into the foothills of the Sierra Nevada (Keeler-Wolf, personal observation).

References:
Klein and Evens 2005

Cercocarpus betuloides-Adenostoma fasciculatum Shrubland Association

Birch Leaf Mountain Mahogany-Chamise Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2115

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest-facing slopes at low elevations between 154–618 m. It is characterized by a codominance of *Cercocarpus betuloides* and *Adenostoma fasciculatum* in the shrub layer. *Melica imperfecta* occurs regularly in many of the stands at low cover in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 154–618 m, mean 315.5 m
Aspect: northwest
Slope: range 15–40 degrees, mean 32.5 degrees
Topography (micro; macro): variable (all); middle to upper slope
Litter Cover: range 8–55%, mean 31.5%
Small Rock Cover: range 8–35%, mean 20.6%
Large Rock Cover: range 0–15%, mean 4.2%
Bare Ground: range 15–32%, mean 22.4%
Parent Material: igneous
Soil Texture: medium to moderately fine clay loam

Vegetation Description:
Stands of *Cercocarpus betuloides-Adenostoma fasciculatum* Shrubland form an intermittent shrub layer (35–52%, mean 43.7%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–20%, mean 4.9%) at 0–2 m tall. Trees are occasionally emergent (0–4% cover, mean 0.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 35–60%, mean cover is 49.8%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Cercocarpus betuloides, Heteromeles arbutifolia,* and *Malosma laurina*. *Salvia mellifera* is often present and *Quercus berberidifolia* is occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Melica imperfecta, Phacelia* sp., *Brassica nigra, Bromus madritensis, Bromus diandrus, Marah macrocarpus,* and *Centaurea melitensis.*

***Cercocarpus betuloides-Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	13.3	4.0	24.0	X	X	
	CEBE3	*Cercocarpus betuloides*	100	13.0	7.5	23.0		X	
	HEAR5	*Heteromeles arbutifolia*	82	2.6	0.2	10.0		X	
	MALA6	*Malosma laurina*	82	1.2	0.2	3.0		X	
	SAME3	*Salvia mellifera*	73	2.5	0.2	10.0			
	QUBE5	*Quercus berberidifolia*	45	1.2	0.2	6.0			
	CEME	*Ceanothus megacarpus*	36	1.4	1.0	6.0			
	CECR	*Ceanothus crassifolius*	36	0.9	0.2	5.0			
	KECO	*Keckiella cordifolia*	27	1.1	1.0	6.0			
	LONIC	*Lonicera*	27	0.8	0.2	6.0			
	LOSC2	*Lotus scoparius*	27	0.6	0.2	4.0			
	DERI	*Dendromecon rigida*	27	0.6	1.0	3.0			
	MIAU	*Mimulus aurantiacus*	27	0.5	1.0	3.0			
	CESP	*Ceanothus spinosus*	27	0.5	0.2	4.0			
	MAFA	*Malacothamnus fasciculatus*	27	0.2	0.2	2.0			
Herb									
	MEIM	*Melica imperfecta*	27	0.9	1.0	5.0			

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Brassica nigra, Bromus madritensis, Senecio mikanioides, Avena, Bromus hordeaceus, Galium aparine

Samples Used in Description: (n = 11)
AA0476cc, AA1090, rap0366, rap0705m, rap0859, rap0861, rap1684, rap2073, rap2598, rap2789, rap2825

Comments:
This association occurs often at the head of small ravines and canyons on northerly exposures where there is an intermediate set of moisture conditions between convex and concave topography that allows a blending of the two dominant shrubs.

Phases:
None

COMMON NAME	Birch Leaf Mountain Mahogany-Chamise Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G4S4

Global Description

Distribution:
This association is also known from other regions of southern California including western San Gabriel and San Bernardino mountains, the San Jacinto Mountains, and the southern peninsular ranges as well as the Santa Monica Mountains.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Elsewhere it occurs on low to moderately high elevations on moderately steep to steep, southeast- to northeast-facing slopes. Geologic substrate is usually granitic and the soil group is usually alfisols.

Vegetation Description:
Elsewhere it is similar to above local description. The two main species of the association are regularly codominant, and there is usually some *Eriogonum fasciculatum* present (Gordon and White 1994).

Comments:
Interestingly, two recent studies of the vegetation of western Riverside County (Klein and Evens 2005) and San Dieguito River watershed (Evens and San 2005) failed to find this particular association.

References:
Evens and San 2005, Gordon and White 1994, Klein and Evens 2005

Cercocarpus betuloides-Ceanothus spinosus Shrubland Association

Birch Leaf Mountain Mahogany-Greenbark Ceanothus Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2113

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest-facing slopes at low elevations between 64–526 m. It is characterized by a codominance of *Cercocarpus betuloides* and *Ceanothus spinosus* in the shrub layer and an insignificant herbaceous layer with occasional *Leymus condensatus.* The emergent tree layer includes occasional *Quercus agrifolia* and rarely *Juglans californica* and *Platanus racemosa*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 64–526 m, mean 317 m
Aspect: northwest
Slope: range 15–45 degrees, mean 31.3 degrees
Topography (micro; macro): undulating or flat; middle to upper slope
Litter Cover: range 50–70%, mean 60%
Small Rock Cover: range 2–18%, mean 8.3%
Large Rock Cover: range 0–8%, mean 2%
Bare Ground: range 12–42%, mean 22.8%
Parent Material: igneous or sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Cercocarpus betuloides-Ceanothus spinosus* Shrubland form an open to intermittent shrub layer (29–60%, mean 52.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 2–5 m tall. The herbaceous layer is open (0–7%, mean 1.9%) at 0–1 m tall. Trees are occasionally emergent (0–21% cover, mean 2.1%) with hardwoods at 0–15 m tall. Total vegetation cover is 47–65%, mean cover is 55.3%.

In this association, the shrub layer is characterized by *Ceanothus spinosus, Cercocarpus betuloides,* and *Prunus ilicifolia. Heteromeles arbutifolia, Malosma laurina, Ceanothus megacarpus,* and *Adenostoma fasciculatum* are usually included in this layer. The tree layer is emergent and open and may occasionally include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus*, *Bromus diandrus,* and *Melica imperfecta.*

***Cercocarpus betuloides-Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	QUAG-M	*Quercus agrifolia*	27	0.1	0.2	0.2			
Shrub									
	CESP	*Ceanothus spinosus*	100	20.1	10.0	35.0	X	X	
	CEBE3	*Cercocarpus betuloides*	100	15.7	9.0	25.0	X	X	
	PRIL	*Prunus ilicifolia*	82	1.9	0.2	5.0		X	
	HEAR5	*Heteromeles arbutifolia*	64	1.7	1.0	5.0			
	CEME	*Ceanothus megacarpus*	55	4.9	2.0	22.0			
	ADFA	*Adenostoma fasciculatum*	55	1.9	0.2	7.0			
	MALA6	*Malosma laurina*	55	0.9	0.2	5.0			
	RHOV	*Rhus ovata*	45	0.6	1.0	3.0			
	SAME3	*Salvia mellifera*	36	1.0	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	36	0.1	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	27	1.2	0.2	13.0			
Herb									
	LECO12	*Leymus condensatus*	36	0.3	0.2	2.0			

Other Noteworthy Species:
Juglans californica was found in 2 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Bromus madritensis, Avena, Avena barbata, Avena fatua, Brassica nigra, Bromus hordeaceus, Foeniculum vulgare

Samples Used in Description: (n = 11)
AA0519, AA0861, AA1141, rap0004, rap0125, rap0134, rap0429m, rap1332m, rap1644m, rap2623, rap2826

Comments:
This is the local mesic version of the *Cercocarpus betuloides* Alliance. Its environmental position is typically on concave slopes adjacent to the more mesic *Ceanothus spinosus* Alliance stands but typically at higher-slope positions. It represents a more mesic setting than the *C. betuloides* Association and is significantly more mesic than the *C. betuloides-Adenostoma fasciculatum* Association. All the local *Cercocarpus betuloides* Associations in the SAMO study area tend to occur in small stands in intermediate positions between other more widespread alliances such as *Ceanothus megacarpus, C. spinosus,* or *Adenostoma fasciculatum* Alliance stands.

Further detailed description of the understory of this and other steep mesophytic stands of chaparral would likely reveal more species of shared herbs and grasses such as *Melica imperfecta*.

Phases:
None

COMMON NAME	Birch Leaf Mountain Mahogany-Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Cercocarpus betuloides-Malosma laurina-Artemisia californica Shrubland Association

Birch Leaf Mountain Mahogany-Laurel Sumac-California Sagebrush Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2117

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep northeast-facing slopes at low elevations between 33–743 m. It is characterized by dominance of *Cercocarpus betuloides* and subdominance to codominance of *Malosma laurina* in the shrub layer. *Melica imperfecta* and scattered other native and nonnative species are present in the herbaceous layer. The emergent tree layer includes infrequent *Quercus agrifolia* and *Umbellularia californica*.

Distribution:
This association is sampled in the Immediate Coast, Eastern Urban, Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 33–743 m, mean 177.5 m
Aspect: northeast
Slope: range 12–48 degrees, mean 34.1 degrees
Topography (micro; macro): flat or convex; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 3–55%, mean 18.3%
Large Rock Cover: range 0–85%, mean 12.4%
Bare Ground: range 2–40%, mean 23.1%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Cercocarpus betuloides-Malosma laurina-Artemisia californica* Shrubland form an open to intermittent shrub layer (17–51%, mean 37.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–19%, mean 6.1%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 17–55%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Cercocarpus betuloides, Malosma laurina*, *Heteromeles arbutifolia,* and *Artemisia californica. Salvia mellifera* and *Eriogonum cinereum* are often present, while *Mimulus aurantiacus* is occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Melica imperfecta, Leymus condensatus, Bromus madritensis, Avena fatua, Foeniculum vulgare, Brassica nigra,* and *Marah macrocarpus.*

***Cercocarpus betuloides-Malosma laurina-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEBE3	*Cercocarpus betuloides*	100	13.9	4.0	26.0	X		
	MALA6	*Malosma laurina*	100	6.8	1.0	15.0	X		
	HEAR5	*Heteromeles arbutifolia*	93	2.8	0.2	7.5	X		
	ARCA11	*Artemisia californica*	80	3.6	0.2	13.0	X		
	SAME3	*Salvia mellifera*	73	2.1	0.2	8.0			
	ERCI5	*Eriogonum cinereum*	60	1.0	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	47	0.7	0.2	2.5			
	CESP	*Ceanothus spinosus*	33	1.5	1.0	9.0			
	RHOV	*Rhus ovata*	33	0.8	0.2	6.0			
	SALE3	*Salvia leucophylla*	33	0.4	0.2	2.5			
	YUWH	*Yucca whipplei*	33	0.2	0.2	2.0			
	ADFA	*Adenostoma fasciculatum*	27	0.3	0.2	2.0			
	ERFA2	*Eriogonum fasciculatum*	27	0.1	0.2	1.0			
	ENCA	*Encelia californica*	20	0.2	0.2	2.5			
	HASQ2	*Hazardia squarrosa*	20	0.1	0.2	1.0			
Herb									
	MEIM	*Melica imperfecta*	47	1.9	0.2	10.0			
	LECO12	*Leymus condensatus*	33	1.0	1.0	8.0			
	POACXX	*Poaceae*	20	0.9	0.2	8.0			
	BRMA3	*Bromus madritensis*	20	0.3	0.2	4.0			X

Other Noteworthy Species:
Juglans californica was found in 1 of 15 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Avena, Avena fatua, Brassica nigra, Foeniculum vulgare, Senecio mikanioides, Schinus molle, Nerium oleander, Conium maculatum, Hirschfeldia incana, Ailanthus altissima, Centaurea melitensis, Erodium, Euphorbia terracina, Nicotiana glauca, Pennisetum setaceum, Piptatherum miliaceum

Samples Used in Description: (n = 15)
AA0010cc, AA0185cc, AA0926, rap0163, rap0166, rap0273, rap0919, rap0928, rap1052, rap1116, rap1181m, rap1192m, rap1865m, rap2167m, rap2644

Comments:
This is a low elevation, largely coastal association that likely does not range much beyond the SAMO study area and the western transverse ranges. It typically occurs on northerly facing slopes immediately adjacent to coastal scrub alliances such as the *Artemisia californica* Alliance. These stands are usually well within the coastal summer fog zone. Two phases have been defined, one with relatively more *Malosma laurina* and the other with relatively more *A. californica*.

Phases:
Cercocarpus betuloides-Malosma laurina-Artemisia californica (Birch Leaf Mountain Mahogany-Laurel Sumac) Phase [2117]
Cercocarpus betuloides-Artemisia californica/Melica imperfecta (Birch Leaf Mountain Mahogany-California Sagebrush [Provisional]) Phase [2111]

COMMON NAME	Birch Leaf Mountain Mahogany-Laurel Sumac-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Coreopsis gigantea-Artemisia californica-Eriogonum cinereum Shrubland Association

Giant Coreopsis-California Sagebrush-Ashy Buckwheat Shrubland Association
***Coreopsis gigantea* Shrubland Alliance**
Giant Coreopsis Shrubland Alliance

Mapping Code: 3345

Local Description

Summary:
This shrubland association occurs on flat to very steep southwest- to northeast-facing slopes at low elevations between 1–407 m. It is characterized by a dominance of *Coreopsis gigantea* with a co- or subdominance of *Artemisia californica* and *Eriogonum cinereum* in the shrub layer. The herbaceous layer may have low cover of *Leymus condensatus*, *Melica imperfecta,* and scattered nonnative species. The emergent tree layer is typically absent but may include nonnative species.

Distribution:
This association is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 1–407 m, mean 51.1 m
Aspect: southwest to northeast
Slope: range 0–60 degrees, mean 34.4 degrees
Topography (micro; macro): undulating or flat; bottom to middle slope
Litter Cover: range 5–15%, mean 10%
Small Rock Cover: range 10–50%, mean 28.5%
Large Rock Cover: range 0–30%, mean 6%
Bare Ground: range 8–50%, mean 32.8%
Parent Material: quaternary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Coreopsis gigantea-Artemisia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (14–48%, mean 28.3%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–30%, mean 8.4%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.1%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 23–55%, mean cover is 36.4%.

In this association, the shrub layer is characterized by *Coreopsis gigantea, Artemisia californica, Rhus integrifolia,* and *Eriogonum cinereum*. *Yucca whipplei, Encelia californica, Malosma laurina,* and *Isomeris arborea* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Eucalyptus* sp. and *Pinus* sp. at low cover. The herbaceous layer is diverse and may include *Leymus condensatus, Melica imperfecta, Foeniculum vulgare, Bromus madritensis*, *Carpobrotus edulis,* and *Brassica nigra.*

Coreopsis gigantea-Artemisia californica-Eriogonum cinereum

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	COGI	*Coreopsis gigantea*	100	9.0	2.0	21.0	X	X	
	ARCA11	*Artemisia californica*	90	5.4	0.2	20.0		X	
	RHIN2	*Rhus integrifolia*	86	3.3	0.2	10.0		X	
	ERCI5	*Eriogonum cinereum*	76	3.2	0.2	8.0		X	
	YUWH	*Yucca whipplei*	43	0.9	0.2	4.0			
	ENCA	*Encelia californica*	43	0.8	0.2	5.0			
	MALA6	*Malosma laurina*	33	0.9	0.2	7.0			
	ISAR	*Isomeris arborea*	33	0.3	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	24	0.4	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	24	0.4	0.2	3.0			
Herb									
	LECO12	*Leymus condensatus*	48	0.8	0.2	8.0			
	MEIM	*Melica imperfecta*	29	1.0	1.0	7.0			
	FOVU	*Foeniculum vulgare*	29	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	24	0.3	0.2	3.0			X

Other Noteworthy Species:
Erysimum insulare was found in 1 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Foeniculum vulgare, Bromus madritensis, Carpobrotus edulis, Brassica nigra, Pennisetum setaceum, Carpobrotus chilensis, Salsola tragus, Nicotiana glauca, Cortaderia, Malva parviflora, Mesembryanthemum crystallinum, Bromus diandrus, Eucalyptus, Medicago polymorpha, Melilotus indicus, Myoporum laetum, Brassica, Cakile maritima, Erodium cicutarium, Hirschfeldia incana, Marrubium vulgare, Oxalis pes-caprae, Raphanus sativus, Sonchus oleraceus

Samples Used in Description: (n = 21)
AA0869, AA1058, AA1059, AA1062, AA1063, rap0520, rap0639, rap0645, rap0666, rap0903, rap0907, rap0938, rap1045, rap1156, rap1201, rap1273, rap1276, rap2818, rap2887rlv, rap2888rlv, rap2889rlv

Comments:
This is an association restricted to the immediate coast, usually on steep bluffs or stable slopes within a kilometer of the ocean. The dominant species is a drought-deciduous soft woody shrub, which is very frost sensitive. *Coreopsis gigantea* is an indicator and may not always be a dominant. Due to the withering nature of *C. gigantea* in the later summer and fall months, these stands appear to have much higher relative cover of the codominant shrubs.

Phases:
None

COMMON NAME Giant Coreopsis-California Sagebrush-Ashy Buckwheat Shrubland Association

SYNONYM None

PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Coreopsis gigantea* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur locally along the immediate coast of adjacent Santa Barbara County and also on Santa Cruz and perhaps other northern Channel Islands.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Coreopsis gigantea-Ericameria ericoides-Encelia californica Shrubland Association

Giant Coreopsis-Dune Goldenbush-California Encelia Shrubland Association
***Coreopsis gigantea* Shrubland Alliance**
Giant Coreopsis Shrubland Alliance

Mapping Code: 3342

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast-facing slopes at low elevations between 0–40 m. It is characterized by a codominance of *Coreopsis gigantea* and *Ericameria ericoides* in the shrub layer and a variety of psammophytic coastal species in the herbaceous layer. The emergent tree layer is absent.

Distribution:
This association is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–40 m, mean 21.3 m
Aspect: northeast or flat
Slope: range 0–35 degrees, mean 9.5 degrees
Topography (micro; macro): flat or undulating; lower slope to ridgetop
Litter Cover: range 35–60%, mean 47.5%
Small Rock Cover: range 0–10%, mean 3.7%
Large Rock Cover: range 0–5%, mean 0.6%
Bare Ground: range 20–80%, mean 48.4%
Parent Material: quaternary
Soil Texture: coarse to medium loamy sand

Vegetation Description:
Stands of *Coreopsis gigantea-Ericameria ericoides-Encelia californica* Shrubland form an open to intermittent shrub layer (2–60%, mean 24.2%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–2 m tall. The herbaceous layer is open to intermittent (0–41%, mean 10.6%) at 0–1 m tall. Trees are not present. Total vegetation cover is 17–60%, mean cover is 34.9%.

In this association, the shrub layer is characterized by *Coreopsis gigantea, Encelia californica,* and *Ericameria ericoides. Opuntia littoralis* is often present and *Rhus integrifolia* is occasionally included in this layer. The tree layer is absent. The herbaceous layer is diverse and occasionally includes *Croton californicus, Eschscholzia californica, Carpobrotus edulis,* and *Marah macrocarpus.*

***Coreopsis gigantea-Ericameria ericoides-Encelia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	COGI	*Coreopsis gigantea*	94	7.6	0.2	18.0	X	X	
	ENCA	*Encelia californica*	94	3.8	0.2	12.0		X	
	ERER11	*Ericameria ericoides*	75	5.7	0.2	21.0		X	
	OPLI3	*Opuntia littoralis*	62	1.4	0.2	6.0			
	RHIN2	*Rhus integrifolia*	44	2.2	0.2	28.0			
	BAPI	*Baccharis pilularis*	38	0.2	0.2	2.0			
	ISME5	*Isocoma menziesii*	31	0.4	0.2	6.0			
	ERPA8	*Eriogonum parvifolium*	31	0.3	0.2	3.0			
	LOSC2	*Lotus scoparius*	31	0.2	0.2	2.0			
	ARCA11	*Artemisia californica*	25	0.2	0.2	2.0			
Herb									
	CRCA5	*Croton californicus*	62	1.6	0.2	5.0			
	ESCA2	*Eschscholzia californica*	62	0.9	0.2	5.0			
	CAED3	*Carpobrotus edulis*	56	0.6	0.2	5.0			X
	PHACE	*Phacelia*	50	0.7	0.2	3.0			
	MAMA8	*Marah macrocarpus*	44	0.3	0.2	2.0			
	BRDI3	*Bromus diandrus*	25	1.0	0.2	10.0			X
	RASA2	*Raphanus sativus*	25	0.6	0.2	5.0			X
	AMCH4	*Ambrosia chamissonis*	25	0.2	0.2	2.0			
	GNAPH	*Gnaphalium*	25	0.1	0.2	0.2			
	LEFI11	*Lessingia filaginifolia*	25	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Carpobrotus edulis, Bromus diandrus, Raphanus sativus, Brassica, Erodium moschatum, Medicago polymorpha, Pennisetum setaceum, Anagallis arvensis, Bromus madritensis, Foeniculum vulgare, Brassica nigra, Brassica rapa, Erodium botrys, Erodium cicutarium, Lobularia maritima, Malva parviflora

Samples Used in Description: (n = 16)
rap0515, rap0637, rap0641, rap0642, rap0643, rap0644, rap0646, rap0689, rap0690, rap0691, rap0692, rap0694, rap1128, rap2753, rap2870rlv, rap2871rlv

Comments:
This is a rare and local vegetation type known mostly from the Point Dume area and scattered bluffs westward to Point Mugu. The scattered bluffs, however, do not have *Ericameria ericoides.* Similar stands may exist as far north as San Luis Obispo County at places such as the Nipomo Dunes, although they have not been confirmed elsewhere. Recent removal of *Carpobrotus edulis* for the Point Dume stands should be monitored to ensure protection from reinvasion and human trampling.

Phases:
None

COMMON NAME	Giant Coreopsis-Dune Goldenbush-California Encelia Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Sem-natural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Coreopsis gigantea* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Dendromecon rigida Shrubland Alliance

Bush Poppy Shrubland Alliance

Mapping Code: 3350

Local Description

Summary:
This shrubland alliance occurs on moderately steep to steep northwest- or southeast-facing slopes at low elevations between 0–673 m. It is dominated by *Dendromecon rigida* in the shrub layer. All Santa Monica Mountains stands so far have a constant low cover of *Heteromeles arbutifolia,* and *Adenostoma fasciculatum* is also found in more than 80% of the stands. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–673 m, mean 385.2 m
Aspect: northwest and southeast
Slope: range 12–35 degrees, mean 25 degrees
Topography (micro; macro): flat to undulating; mid to upper slope
Litter Cover: no data
Small Rock Cover: range 4–15%, mean 9.5%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 15–20%, mean 17.5%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (32–57%, mean 40.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–1%, mean 0.2%) at 0–1 m tall. Trees are occasionally emergent (0–15% cover, mean 3%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–58%, mean cover is 42.5%.

In this association, the shrub layer is characterized by *Dendromecon rigida, Heteromeles arbutifolia*, and *Adenostoma fasciculatum*. *Malosma laurina, Rhus ovata, Quercus berberidifolia*, *Ceanothus spinosus,* and *Prunus ilicifolia* are occasionally included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Poaceae* sp.

***Dendromecon rigida* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	50	1.8	1.0	8.0	X		
Shrub									
	DERI	*Dendromecon rigida*	100	21.2	16.0	29.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	100	0.9	0.2	2.0		X	
	ADFA	*Adenostoma fasciculatum*	83	0.8	0.2	4.0		X	
	MALA6	*Malosma laurina*	67	1.2	0.2	6.0			
	CESP	*Ceanothus spinosus*	50	2.0	1.0	7.0			
	QUBE5	*Quercus berberidifolia*	50	1.4	0.2	6.0			
	RHOV	*Rhus ovata*	50	0.5	0.2	2.0			
	PRIL	*Prunus ilicifolia*	50	0.1	0.2	0.2			
	CEME	*Ceanothus megacarpus*	33	4.0	8.0	16.0			
	CEOL	*Ceanothus oliganthus*	33	1.2	2.0	5.0			

Other Noteworthy Species:
None

Nonnative Species:
Eucalyptus

Samples Used in Description: (n = 6)
AA0334, rap0252, rap0263m, rap2665, rap2761, rap2919

Comments:
This is a typically ephemeral, postfire vegetation alliance. It has not been sampled extensively except in this study. It forms short-lived stands in burned chaparral that appear to exist about 10 years or less. The seeds are long lived. Over a period of several years, *Dendromecon* is replaced by resprouting shrubs of *Adenostoma* sp., *Heteromeles arbutifolia, Malosma laurina, Rhus ovata*, and seedlings of other species of longer-lived shrubs such as *Ceanothus megacarpus*.

Phases:
None

COMMON NAME	Bush Poppy Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.a. Temperate broad-leaved evergreen shrubland
ALLIANCE	*Dendromecon rigida* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, it is likely that with widespread sampling throughout its California range, the *D. rigida* Alliance will be found throughout California from Shasta County to San Diego County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Stands with *Dendromecon rigida* occur in many chaparral types following fire. In Yosemite National Park (Keeler-Wolf et al. 2003), stands with *D. rigida* were considered an association of the *Adenostoma fasciculatum* Alliance. It remains to be seen if analogs to the strongly dominated *D. rigida* stands in the Santa Monica Mountains will be found elsewhere in California.

References:
Keeler-Wolf et al. 2003

Encelia californica Shrubland Association

California Encelia Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3222

Local Description

Summary:
This shrubland association occurs on gentle to steep southwest- and southeast-facing slopes at low elevations between 2–496 m. It is characterized by strong dominance of *Encelia californica* in the shrub layer and a scattering of mostly nonnative species in the herbaceous layer. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Immediate Coast, Dry Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, Eastern Urban, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 2–496 m, mean 205.8 m
Aspect: southwest and southeast
Slope: range 0–38 degrees, mean 24.4 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: range 10–75%, mean 38.9%
Small Rock Cover: range 0–65%, mean 16%
Large Rock Cover: range 0–10%, mean 0.9%
Bare Ground: range 0–55%, mean 31.4%
Parent Material: sedimentary
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Encelia californica* Shrubland form an open to continuous shrub layer (12–69%, mean 34.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–31%, mean 4.7%) at 0–1 m tall. Trees are occasionally emergent (0–12% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 24–70%, mean cover is 39.8%.

In this association, the shrub layer is characterized by abundant *Encelia californica*. *Artemisia californica* and *Malosma laurina* are usually present, while *Salvia mellifera* and *Yucca whipplei* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and often includes *Brassica nigra*. *Bromus madritensis, Leymus condensatus,* and *Centaurea melitensis* are sometimes present.

***Encelia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	23.8	6.0	50.0	X	X	
	ARCA11	*Artemisia californica*	62	0.9	0.2	6.0			
	MALA6	*Malosma laurina*	60	1.6	0.2	10.0			
	SAME3	*Salvia mellifera*	50	1.2	0.2	13.0			
	YUWH	*Yucca whipplei*	43	0.3	0.2	2.0			
	SALE3	*Salvia leucophylla*	38	0.4	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	36	1.7	0.2	14.0			
	ERCI5	*Eriogonum cinereum*	36	0.7	0.2	6.0			
	RHIN2	*Rhus integrifolia*	33	0.5	0.2	6.0			
	MAFA	*Malacothamnus fasciculatus*	24	0.4	0.2	8.0			
	MILA6	*Mirabilis laevis*	24	0.2	0.2	5.0			
Herb									
	BRNI	*Brassica nigra*	55	0.7	0.2	7.5			X
	BRMA3	*Bromus madritensis*	36	0.3	0.2	4.0			X
	LECO12	*Leymus condensatus*	26	0.7	0.2	10.0			
	CEME2	*Centaurea melitensis*	24	0.3	0.2	8.0			X

Other Noteworthy Species:
Juglans californica was found in 2 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Centaurea melitensis, Nicotiana glauca, Bromus diandrus, Hirschfeldia incana, Ricinus communis, Erodium cicutarium, Avena fatua, Pennisetum setaceum, Myoporum laetum, Avena, Melilotus indicus, Euphorbia terracina, Salsola tragus, Foeniculum vulgare, Malva parviflora, Marrubium vulgare, Sonchus oleraceus, Schinus molle, Opuntia ficus-indica, Avena barbata, Brassica, Bromus hordeaceus, Cakile maritima, Carduus pycnocephalus, Cortaderia, Lactuca serriola, Lamarckia aurea, Medicago polymorpha, Melilotus officinalis, Piptatherum miliaceum, Senecio vulgaris, Silybum marianum, Vicia villosa

Samples Used in Description: (n = 42)
AA0372cc, AA0373cc, AA0497, AA0615, AA0976, AA0995, AA1097, AA1111, rap0036, rap0330, rap0334, rap0623, rap0657, rap0915, rap0923, rap0926, rap0934, rap0972, rap0981, rap1047, rap1063, rap1269, rap1420, rap1421m, rap1463, rap1525, rap1596, rap1598, rap1638, rap1745, rap1794, rap1830, rap1837, rap1851, rap1963, rap2046, rap2051, rap2514, rap2755, rap2816, rap2869rlv, rap2905rlv

Comments:
This is the standard version of the *Encelia californica* Alliance in the study area. As with other examples of this alliance defined elsewhere, it typically contains a relatively large nonnative herbaceous component with evidence of recent disturbance from fire or clearing. *E. californica* seems to require disturbance of this type to maintain stands over time. Otherwise, it may succeed to more stable versions of coastal scrub such as associations in the *Artemisia californica, Salvia leucophylla, Salvia mellifera,* or *Eriogonum cinereum* Alliances. Two phases

have been identified, one with essentially pure dominance of *E. californica* and the other with a mixture of *Eriogonum fasciculatum* and *Encelia californica*.

Phases:
Encelia californica (California Encelia) Phase [3222]
Encelia californica-Eriogonum fasciculatum (California Encelia-California Buckwheat) Phase [3224]

COMMON NAME	California Encelia Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Other studies of this alliance (Klein and Evens 2005, Evens and San 2005) have not defined this association. They do describe similar associations but with a mixture of *Encelia californica* and *Artemisia californica*.

References:
Evens and San 2005, Klein and Evens 2005

Encelia californica-Artemisia californica Shrubland Association

California Encelia-California Sagebrush Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3227

Local Description

Summary:
This shrubland association occurs on gentle to very steep southwest-and southeast-facing slopes at low elevations between 3–423 m. It is characterized by a codominance of *Encelia californica* and *Artemisia californica* in the shrub layer and a largely nonnative herbaceous layer characterized by *Brassica nigra*. The emergent tree layer includes *Juglans californica* and *Sambucus mexicana*.

Distribution:
This association is sampled in the Eastern Urban, Immediate Coast, Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 3–423 m, mean 211 m
Aspect: southwest and southeast
Slope: range 2–50 degrees, mean 27.1 degrees
Topography (micro; macro): variable (all); middle to upper slope
Litter Cover: range 35–55%, mean 45%
Small Rock Cover: range 5–40%, mean 20.7%
Large Rock Cover: range 0–15%, mean 1.9%
Bare Ground: range 10–65%, mean 33.5%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine to fine silty or sandy clay loam

Vegetation Description:
Stands of *Encelia californica-Artemisia californica* Shrubland form an open to intermittent shrub layer (5–47%, mean 28.9%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (1–25%, mean 10.5%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–52%, mean cover is 39.6%.

In this association, the shrub layer is characterized by *Encelia californica* and *Artemisia californica. Malosma laurina* and *Salvia mellifera* are often present, while *Sambucus mexicana* and *Baccharis pilularis* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and is characterized by *Brassica nigra*. Other herbs sometimes include *Marah macrocarpus, Marrubium vulgare, Bromus diandrus,* and *Leymus condensatus.*

***Encelia californica-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	21	0.4	1.0	3.0			
Tree Understory									
	SAME5	*Sambucus mexicana*	21	0.2	0.2	1.0			
Shrub									
	ENCA	*Encelia californica*	100	11.2	4.0	22.0	X	X	
	ARCA11	*Artemisia californica*	100	9.2	0.2	26.0	X	X	
	MALA6	*Malosma laurina*	71	2.0	1.0	5.0			
	SAME3	*Salvia mellifera*	57	2.0	0.2	7.5			
	SAME5	*Sambucus mexicana*	50	0.6	0.2	2.5			
	BAPI	*Baccharis pilularis*	36	0.9	0.2	10.0			
	RHIN2	*Rhus integrifolia*	29	0.4	0.2	2.5			
	NIGL	*Nicotiana glauca*	29	0.3	0.2	2.0			X
	HEAR5	*Heteromeles arbutifolia*	29	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	21	0.4	0.2	4.0			
	ISME5	*Isocoma menziesii*	21	0.1	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	21	0.01	0.2	0.2			
Herb									
	BRNI	*Brassica nigra*	93	4.6	0.2	18.0	X	X	X
	MAMA8	*Marah macrocarpus*	50	0.3	0.2	2.0			
	BRDI3	*Bromus diandrus*	43	2.5	0.2	17.0			X
	LECO12	*Leymus condensatus*	43	0.4	0.2	2.5			
	MAVU	*Marrubium vulgare*	43	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	36	0.5	0.2	3.0			X
	ERODI	*Erodium*	36	0.2	0.2	1.0			X
	MEPO3	*Medicago polymorpha*	29	0.1	0.2	0.2			X
	BROMU	*Bromus*	21	0.3	1.0	2.5			

Other Noteworthy Species:
Stanleya pinnata was found in 1 of 14 surveys of this plant community. Regionally, the park considers this species as Locally Rare. This species is not listed by CNPs. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 14 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Marrubium vulgare, Bromus madritensis, Erodium, Nicotiana glauca, Medicago polymorpha, Hirschfeldia incana, Centaurea melitensis, Foeniculum vulgare, Melilotus indicus, Myoporum laetum, Euphorbia terracina, Carpobrotus chilensis, Arundo donax, Cakile maritima, Carpobrotus edulis, Galium aparine, Malva parviflora, Pennisetum setaceum, Salsola tragus, Schinus molle, Brassica, Conium maculatum, Erodium cicutarium, Ricinus communis

Samples Used in Description: (n = 14)
AA0149cc, rap0629, rap0668, rap0712, rap0746, rap0762, rap0950, rap0965, rap1034, rap1088, rap1155, rap1171, rap1455, rap1524

Comments:
This association is less common than the *Encelia californica* Association. It is generally only differentiated from the former association by the codominance of *A. californica* and *E. californica*. This association tends to reflect more stable conditions with less recent disturbance than the former type.

Phases:
None

COMMON NAME	California Encelia-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as other parts of south coastal California including western Riverside and San Diego counties. Malanson 1984 also describes this association from southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
In western Riverside County and San Diego County, stands are found on gentle to somewhat steep slopes at low elevations (below 1,000 m). The ground typically has a moderate to high amount of rock cover and bare exposed soil. Parent material is often granite, less often sedimentary. Soil texture is usually sandy loam.

Vegetation Description:
In western Riverside County (Klein and Evens 2005), *Artemisia californica* is either codominant or subdominant. Other shrubs may intermix at low cover, the most common species being

Eriogonum fasciculatum, *Opuntia parryi*, and *Lessingia filaginifolia*. A variety of native and nonnative forbs and grasses occupies the herb understory. In San Diego County (Evens and San 2005), *Encelia californica* and *Artemisia californica* are codominant in the shrub layer. *Hirschfeldia incana* or *Bromus madritensis* may dominate the herbaceous layer.

Comments:
None

References:
Evens and San 2005, Klein and Evens 2005, Malanson 1984

Encelia californica-Eriogonum cinereum Shrubland Association

California Encelia-Ashy Buckwheat Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3225

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep southeast- and southwest-facing slopes at low elevations between 0–259 m. It is characterized by a codominance of *Encelia californica* and *Eriogonum cinereum* in the shrub layer. As with other associations of this alliance, the herbaceous layer tends to have relatively high frequencies of *Brassica nigra* and other nonnatives. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–259 m, mean 102.9 m
Aspect: southeast and southwest
Slope: range 15–55 degrees, mean 27.2 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 15–35%, mean 27.5%
Small Rock Cover: range 0–40%, mean 15.8%
Large Rock Cover: range 0–30%, mean 3.9%
Bare Ground: range 20–55%, mean 42.7%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine sandy or silty clay loams

Vegetation Description:
Stands of *Encelia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (18–40%, mean 27.1%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (2–15%, mean 6.7%) at 0–1 m tall. Trees are infrequently present. Total vegetation cover is 25–43%, mean cover is 33.5%.

In this association, the shrub layer is characterized by *Encelia californica, Eriogonum cinereum,* and *Artemisia californica. Malosma laurina, Yucca whipplei,* and *Salvia leucophylla* are often present, while *Salvia mellifera* and *Rhus integrifolia* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Brassica nigra* and *Bromus madritensis.*

***Encelia californica-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	9.4	3.0	16.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	8.3	3.0	15.0		X	
	ARCA11	*Artemisia californica*	77	1.6	1.0	3.0		X	
	MALA6	*Malosma laurina*	62	1.9	0.2	7.0			
	YUWH	*Yucca whipplei*	62	0.6	0.2	2.5			
	SALE3	*Salvia leucophylla*	54	0.7	0.2	2.5			
	SAME3	*Salvia mellifera*	46	1.8	2.5	7.5			
	RHIN2	*Rhus integrifolia*	46	0.8	0.2	2.5			
	OPLI3	*Opuntia littoralis*	38	1.2	0.2	6.0			
	ERFA2	*Eriogonum fasciculatum*	38	0.4	0.2	2.5			
	HASQ2	*Hazardia squarrosa*	38	0.3	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	31	0.3	0.2	2.5			
	LOSC2	*Lotus scoparius*	31	0.2	0.2	2.5			
Herb									
	BRNI	*Brassica nigra*	69	1.3	0.2	5.0			X
	BRMA3	*Bromus madritensis*	69	1.0	0.2	4.0			X
	LECO12	*Leymus condensatus*	46	0.8	1.0	3.0			
	CEME2	*Centaurea melitensis*	38	0.3	0.2	2.5			X
	BRDI3	*Bromus diandrus*	31	0.8	0.2	7.5			X
	NALE2	*Nassella lepida*	31	0.3	0.2	3.0			
	CHST4	*Chorizanthe staticoides*	23	0.4	1.0	2.5			
	CHAMA15	*Chamaesyce*	23	0.1	0.2	1.0			
	BRHO2	*Bromus hordeaceus*	23	0.01	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Brassica nigra, Bromus madritensis, Centaurea melitensis, Bromus diandrus, Bromus hordeaceus, Avena fatua, Avena, Schinus molle, Pennisetum setaceum, Erodium cicutarium, Melilotus indicus, Arundo donax, Cakile maritima, Hedera helix, Avena barbata, Carpobrotus edulis, Datura stramonium, Erodium, Eucalyptus, Foeniculum vulgare, Nicotiana glauca, Piptatherum miliaceum, Ricinus communis, Salsola tragus

Samples Used in Description: (n = 13)
AA0230cc, AA0377cc, AA0391cc, rap0055, rap0056, rap0058, rap0962, rap0996, rap1110m, rap1136, rap1466, rap1592, rap2922

Comments:
This association is likely endemic to the Santa Monica Mountains and vicinity. It has slightly lower than average vegetation cover and slightly steeper slopes than other types within the *Encelia californica* Alliance. The codominance of *Encelia* and *Eriogonum cinereum* is diagnostic.

Phases:
None

COMMON NAME	California Encelia-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Encelia californica-Malosma laurina-Salvia mellifera Shrubland Association

California Encelia-Laurel Sumac-Black Sage Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3221

Local Description

Summary:
This shrubland association occurs on gentle to very steep southeast- and southwest-facing slopes at low elevations between 5–457 m. It is characterized by a codominance of *Encelia californica, Salvia mellifera,* and *Malosma laurina* in the shrub layer. The herbaceous layer is diverse and dominated by nonnative grasses and herbs. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Eastern Urban, Dry Inland, Immediate Coast, Western Fog Zone, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 5–457 m, mean 248.8 m
Aspect: southeast and southwest
Slope: range 1–48 degrees, mean 29.3 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 15–45%, mean 28.8%
Small Rock Cover: range 4–35%, mean 17.8%
Large Rock Cover: range 0–8%, mean 2.5%
Bare Ground: range 5–50%, mean 30%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Encelia californica-Malosma laurina-Salvia mellifera* Shrubland form an open to intermittent shrub layer (5–55%, mean 35.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–10 m tall. The herbaceous layer is open to intermittent (0–40%, mean 3.8%) at 0-1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.3%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 29–60%, mean cover is 39.4%.

In this association, the shrub layer is characterized by *Encelia californica, Salvia mellifera*, *Malosma laurina,* and *Yucca whipplei. Artemisia californica* is often present, while *Eriogonum fasciculatum, Eriogonum cinereum,* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Marah macrocarpus, Bromus madritensis*, *Pennisetum setaceum,* and *Medicago polymorpha*.

***Encelia californica-Malosma laurina-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	10.9	5.0	20.0		X	
	SAME3	*Salvia mellifera*	94	7.5	0.2	22.0		X	
	MALA6	*Malosma laurina*	88	8.7	0.2	30.0		X	
	YUWH	*Yucca whipplei*	75	1.3	0.2	4.0		X	
	ARCA11	*Artemisia californica*	59	0.8	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	50	1.2	0.2	7.0			
	ERCI5	*Eriogonum cinereum*	41	1.0	0.2	6.0			
	CEME	*Ceanothus megacarpus*	34	1.6	0.2	12.0			
	RHOV	*Rhus ovata*	31	0.6	0.2	5.0			
	RHIN2	*Rhus integrifolia*	31	0.3	0.2	3.0			
	ADFA	*Adenostoma fasciculatum*	28	0.6	0.2	7.0			
	MAFA	*Malacothamnus fasciculatus*	28	0.4	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	28	0.3	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	47	0.4	0.2	3.0			X
	LECO12	*Leymus condensatus*	25	0.4	0.2	4.0			
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	1.0			

Other Noteworthy Species:
Juglans californica was found in 1 of 32 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Pennisetum setaceum, Nicotiana glauca, Medicago polymorpha, Centaurea melitensis, Bromus diandrus, Erodium, Melilotus indicus, Hirschfeldia incana, Carpobrotus edulis, Foeniculum vulgare, Marrubium vulgare, Ricinus communis, Ageratina adenophora, Avena, Avena fatua, Erodium cicutarium, Piptatherum miliaceum, Schinus molle, Vicia villosa

Samples Used in Description: (n = 32)
AA0133cc, AA0252cc, AA0314cc, AA0580, AA0667, AA0674, AA1016, rap0042, rap0305m, rap0610m, rap0611, rap0613, rap0630, rap0658, rap0749, rap0751, rap0886, rap0979, rap1004, rap1025m, rap1114, rap1182, rap1184, rap1193, rap1196m, rap1279, rap1669m, rap2106, rap2268, rap2635, rap2860rlv, rap2933

Comments:
This association is distinctive from others in the *Encelia californica* Alliance by having a codominance of three shrubs. One of them, *Malosma laurina,* is an evergreen broadleaf species that contrasts with the other two codominants by being typically both taller and broader. *Salvia mellifera* and *Encelia californica* may look similar from a distance, especially during the summer when their leaves are drier and may be mostly absent.

Phases:
None

COMMON NAME	California Encelia-Laurel Sumac-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is apparently endemic to the Santa Monica Mountains area; however, it may occur elsewhere in south coastal California.

References:
None

Encelia californica-Rhus integrifolia Shrubland Association

California Encelia-Lemonade Berry Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3226

Local Description

Summary:
This shrubland association occurs on somewhat steep to abrupt southeast-facing slopes at low elevations between 2–625 m. It is characterized by a codominance of *Encelia californica* and *Rhus integrifolia* in the shrub. The herbaceous layer is generally insignificant and composed of nonnative species. The emergent tree layer is usually not present.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Dry Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 2–625 m, mean 148.8 m
Aspect: southeast
Slope: range 15–75 degrees, mean 37.4 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 5–15%, mean 10%
Small Rock Cover: range 10–50%, mean 26.3%
Large Rock Cover: range 0–8%, mean 3.3%
Bare Ground: range 5–60%, mean 29.6%
Parent Material: igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Encelia californica-Rhus integrifolia* Shrubland form an open to intermittent shrub layer (10–51%, mean 32.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–11%, mean 2.2%) at 0-1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 12–51%, mean cover is 35%.

In this association, the shrub layer is characterized by *Encelia californica, Rhus integrifolia,* and *Eriogonum cinereum. Salvia mellifera* and *Yucca whipplei* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Schinus molle* and *Pinus* sp. at low cover. The herbaceous layer is simple and sometimes includes *Dichelostemma capitatum, Bromus madritensis, Nassella lepida, Avena fatua,* and *Pennisetum setaceum*.

***Encelia californica-Rhus integrifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	8.6	3.0	16.0		X	
	RHIN2	*Rhus integrifolia*	100	7.5	1.0	16.0		X	
	ERCI5	*Eriogonum cinereum*	80	3.6	0.2	12.0		X	
	SAME3	*Salvia mellifera*	73	4.0	0.2	11.0			
	YUWH	*Yucca whipplei*	73	1.5	1.0	6.0			
	ARCA11	*Artemisia californica*	60	0.8	0.2	4.0			
	MALA6	*Malosma laurina*	47	0.9	1.0	3.0			
	SALE3	*Salvia leucophylla*	27	0.6	0.2	8.0			
	ERFA2	*Eriogonum fasciculatum*	27	0.5	0.2	4.0			
	ISAR	*Isomeris arborea*	27	0.5	0.2	4.0			
	COGI	*Coreopsis gigantea*	27	0.2	0.2	2.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.3	0.2	4.0			
	RHOV	*Rhus ovata*	20	0.2	1.0	1.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.2	0.2	2.0			
	MILA6	*Mirabilis laevis*	20	0.01	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	27	0.2	0.2	2.0			X
	NALE2	*Nassella lepida*	20	0.3	0.2	3.0			
	PESE3	*Pennisetum setaceum*	20	0.2	0.2	2.0			X
	AVFA	*Avena fatua*	20	0.01	0.2	0.2			X
	BRMA3	*Bromus madritensis*	20	0.01	0.2	0.2			X
	DICA14	*Dichelostemma capitatum*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 15 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Pennisetum setaceum, Avena fatua, Bromus madritensis, Myoporum laetum, Erodium cicutarium, Brassica nigra, Bromus hordeaceus, Nicotiana glauca, Foeniculum vulgare, Bromus diandrus, Hirschfeldia incana, Schinus molle, Sonchus oleraceus

Samples Used in Description: (n = 15)
AA1007, AA1009, AA1010, rap0659, rap0661, rap0884, rap0932, rap1297, rap1465, rap1602, rap1821, rap1836, rap2113, rap2610, rap2804

Comments:
This association differs from the other *Encelia californica* associations by the codominance of the low sprawling evergreen shrub *Rhus integrifolia*. This may resemble the *E. californica-Salvia mellifera-Malosma laurina* Association in structure. It differs from that type by being typically restricted to low elevation and steep slopes, usually relatively close to the ocean. This is a common vegetation type on bluffs facing the immediate coast along Pacific Coast Highway.

Phases:
None

COMMON NAME	California Encelia-Lemonade Berry Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association may also occur elsewhere close to the ocean in southern California (Sawyer and Keeler-Wolf 1995). Due to development along the coast, it is likely to be relatively rare with few high-quality examples remaining out of protected areas.

References:
Sawyer and Keeler-Wolf 1995

Eriogonum cinereum Shrubland Association

Ashy Buckwheat Shrubland Association
***Eriogonum cinereum* Shrubland Alliance**
Ashy Buckwheat Shrubland Alliance

Mapping Code: 3257

Local Description

Summary:
This shrubland association occurs on moderate to abrupt southwest-facing slopes at low elevations between 0–500 m. It is characterized by a dominance of *Eriogonum cinereum* in the shrub layer. The herbaceous layer has no characteristic species. The emergent tree layer is generally absent but can include *Quercus agrifolia* and *Umbellularia californica.*

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–500 m, mean 289.5 m
Aspect: southwest
Slope: range 9–80 degrees, mean 35.6 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: range 10–35%, mean 16.7%
Small Rock Cover: range 3–46%, mean 23.1%
Large Rock Cover: range 0–85%, mean 17.1%
Bare Ground: range 0–65%, mean 27.8%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (3–37%, mean 18.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–33%, mean 10.7%) at 0–2 m tall. Trees are occasionally emergent (0–2% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 6–47%, mean cover is 29.2%.

In this association, the shrub layer is characterized by *Eriogonum cinereum. Artemisia californica* is usually present. *Yucca whipplei, Salvia mellifera, Malosma laurina,* and *Lotus scoparius* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Centaurea melitensis, Bromus madritensis, Leymus condensatus, Bromus diandrus,* and *Hirschfeldia incana.*

***Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERCI5	*Eriogonum cinereum*	98	10.9	0.2	25.0	X		
	ARCA11	*Artemisia californica*	71	1.5	0.2	8.0			
	SAME3	*Salvia mellifera*	38	0.4	0.2	5.0			
	YUWH	*Yucca whipplei*	38	0.2	0.2	2.5			
	LOSC2	*Lotus scoparius*	35	1.0	0.2	24.0			
	MALA6	*Malosma laurina*	35	0.7	0.2	6.0			
	SALE3	*Salvia leucophylla*	31	0.6	0.2	10.0			
	ENCA	*Encelia californica*	23	0.4	0.2	4.0			
	BRCA3	*Brickellia californica*	21	0.3	0.2	2.5			
	HEAR5	*Heteromeles arbutifolia*	21	0.2	0.2	2.5			
	RHOV	*Rhus ovata*	21	0.2	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	50	1.6	0.2	12.0		X	
	CEME2	*Centaurea melitensis*	38	1.8	0.2	15.0		X	
	BRMA3	*Bromus madritensis*	31	1.3	0.2	20.0		X	
	LECO12	*Leymus condensatus*	25	0.8	0.2	12.0			
	HIIN3	*Hirschfeldia incana*	21	0.7	0.2	15.0		X	
	BRDI3	*Bromus diandrus*	21	0.7	0.2	8.0		X	

Other Noteworthy Species:
Leptodactylon californicum was found in 1 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Bromus diandrus, Avena fatua, Foeniculum vulgare, Nicotiana glauca, Avena, Piptatherum miliaceum, Avena barbata, Bromus hordeaceus, Eragrostis cilianensis, Cortaderia, Carpobrotus edulis, Centranthus ruber, Erodium cicutarium, Medicago polymorpha, Pennisetum setaceum, Ricinus communis, Salsola tragus, Silybum marianum

Samples Used in Description: (n = 48)
AA0016cc, AA0276cc, AA0504, AA0624, AA0743cc, AA0750cc, AA0858, AA0954, AA1159, AA1161, AA1175, rap0073, rap0093, rap0137, rap0161, rap0389, rap0390, rap0420, rap0463, rap0499, rap1249, rap1250, rap1302, rap1323, rap1367, rap1389, rap1391m, rap1711, rap1722, rap1741, rap1800, rap1804, rap1813, rap1814, rap1819, rap1872, rap1877, rap1927m, rap1947, rap1995, rap1996, rap2000m, rap2127, rap2128, rap2200, rap2586, rap2713, rap2722

Comments:
This is an endemic alliance and association to the Ventura region of California and probably has most of its area represented within the SAMO study area. It is characteristic of steep usually southerly facing slopes below 600 m elevation and is often found on rocky or eroded cliffs. An early seral (postfire) phase has been identified with a higher cover of *Malacothamnus fasciculatus* and *Leymus condensatus*.

Phases:
Eriogonum cinereum (Ashy Buckwheat/Annual Grass-Herb) Phase [3257]
Eriogonum cinereum-Malacothamnus fasciculatus/Leymus condensatus (Ashy Buckwheat-Bush Mallow/Giant Wild Rye) Phase [3259]

COMMON NAME	Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Eriogonum cinereum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Eriogonum fasciculatum Shrubland Association

California Buckwheat Shrubland Association
***Eriogonum fasciculatum* Shrubland Alliance**
California Buckwheat Shrubland Alliance

Mapping Code: 3241

Local Description

Summary:
This shrubland association occurs on gentle to very steep slopes of variable aspect at low elevations between 5–563 m. It is characterized by the dominance of *Eriogonum fasciculatum* in the shrub layer. The herbaceous layer is largely a sparse mix of nonnative species. The emergent tree layer is largely absent.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Eastern Urban Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 5–563 m, mean 389.5 m
Aspect: variable
Slope: range 2–55 degrees, mean 24.2 degrees
Topography (micro; macro): undulating, flat, or convex; lower slope to ridgetop
Litter Cover: range 10–40%, mean 21.7%
Small Rock Cover: range 10–65%, mean 33.4%
Large Rock Cover: range 0–48%, mean 4.7%
Bare Ground: range 8–70%, mean 32.2%
Parent Material: sedimentary or igneous
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Eriogonum fasciculatum* Shrubland form an open to intermittent shrub layer (5–48%, mean 23.3%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–25%, mean 6%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.1%) with hardwoods at 0–2 m tall. Total vegetation cover is 6–49%, mean cover is 29.3%.

In this association, the shrub layer is characterized by *Eriogonum fasciculatum. Lotus scoparius*, *Artemisia californica, Malosma laurina,* and infrequently includes *Quercus agrifolia*. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Bromus diandrus*, *Brassica nigra,* and *Centaurea melitensis.*

***Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	100	14.6	3.0	46.0	X		
	LOSC2	*Lotus scoparius*	58	2.6	0.2	10.0			
	ARCA11	*Artemisia californica*	48	1.2	0.2	7.0			
	MALA6	*Malosma laurina*	45	1.2	0.2	8.0			
	SAME3	*Salvia mellifera*	45	0.8	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	29	0.2	0.2	2.5			
	CEME	*Ceanothus megacarpus*	26	0.3	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	26	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	23	0.6	0.2	11.0			
Herb									
	BRMA3	*Bromus madritensis*	45	0.4	0.2	4.0			X
	BRDI3	*Bromus diandrus*	42	1.2	0.2	16.0			X
	BRNI	*Brassica nigra*	39	0.7	0.2	7.0			X
	CEME2	*Centaurea melitensis*	39	0.7	0.2	7.0			X
	AVENA	*Avena*	23	0.5	0.2	6.0			X

Other Noteworthy Species:
Leptodactylon californicum was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Stanleya pinnata was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Locally Rare. This species is not listed by CNPs. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Bromus diandrus, Brassica nigra, Centaurea melitensis, Avena, Hirschfeldia incana, Nicotiana glauca, Erodium cicutarium, Spartium junceum, Melilotus indicus, Piptatherum miliaceum, Erodium botrys, Avena fatua, Pennisetum setaceum, Foeniculum vulgare, Cistus, Ricinus communis, Medicago polymorpha, Rosmarinus officinalis, Acacia redolens, Avena barbata, Bromus hordeaceus, Cortaderia, Melilotus officinalis, Mesembryanthemum crystallinum

Samples Used in Description: (n = 31)
AA0233cc, AA0274cc, AA0653, AA0798, AA0969, AA1114, AA1126, rap0225m, rap0304, rap0357, rap0391, rap0731, rap0757, rap1275, rap1283, rap1447m, rap1457, rap1458, rap1849, rap1886, rap2131, rap2325, rap2359, rap2362, rap2407, rap2440, rap2469rlv, rap2476, rap2642rlv, rap2657, rap2864rlv

Comments:
This is a common disturbance-related association. It is often found on road cuts and other nonnatural clearings such as fuel breaks and abandoned house pads. It also may occur after fire in chaparral and some drier coastal scrubs. The most common postfire phase is the *Eriogonum fasciculatum-Lotus scoparius* phase.

Phases:
Eriogonum fasciculatum (California Buckwheat) Phase [3241]
Eriogonum fasciculatum-Lotus scoparius (California Buckwheat-Deerweed) Phase [3249]

COMMON NAME	California Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as San Diego and western Riverside counties. It probably is widespread throughout much of central and south coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The *Eriogonum fasciculatum* Association usually occurs on alluvial/depositional, lower to upper slopes that are undulating or convex. Parent material is usually granitic or sedimentary. Many stands denote recent disturbance from invasive annual species, grazing, erosion, foot traffic, and so forth.

Vegetation Description:
In the *Eriogonum fasciculatum* Association, *E. fasciculatum* is consistently present at low to high cover. A wide variety of chaparral, coastal sage, and disturbance shrub species (e.g., *Artemisia californica*, *Lotus scoparius, Lessingia filaginifolia*, *Rhus ovata*, *Salvia apiana*, *Adenostoma fasciculatum*) may be present at low cover. Diverse annual herbs compose the herb understory, the most common being natives *Cryptantha* spp. and nonnatives such as *Hirschfeldia incana, Erodium* spp., *Bromus* spp., and *Avena* spp.

Comments:
The colonization abilities of *Eriogonum fasciculatum* are prodigious in southern California; however, they may be helped in some areas by artificial seeding programs along road cuts and so forth.

References:
Evens and San 2005, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Eriogonum fasciculatum-Salvia mellifera-Malosma laurina Shrubland Association

California Buckwheat-Black Sage-Laurel Sumac Shrubland Association
***Eriogonum fasciculatum* Shrubland Alliance**
California Buckwheat Shrubland Alliance

Mapping Code: 3248

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep southwest- and southeast-facing slopes at low elevations between 0–681 m. It is characterized by a codominance of *Eriogonum fasciculatum, Salvia mellifera,* and *Malosma laurina* in the shrub layer. The herbaceous layer is generally insignificant and composed of scattered nonnative species. The emergent tree layer includes, on occasion, *Quercus agrifolia* and *Q. lobata*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Simi Hills Inland, Dry Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–681 m, mean 408.9 m
Aspect: southwest and southeast
Slope: range 15–50 degrees, mean 31.3 degrees
Topography (micro; macro): undulating, convex, or flat; lower to upper slope
Litter Cover: range 2–40%, mean 24.6%
Small Rock Cover: range 2–50%, mean 23.2%
Large Rock Cover: range 0–50%, mean 5.9%
Bare Ground: range 10–80%, mean 36.4%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Eriogonum fasciculatum-Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (11–48%, mean 31%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–25%, mean 3.8%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–50%, mean cover is 34.9%.

In this association, the shrub layer is characterized by *Eriogonum fasciculatum, Salvia mellifera, Malosma laurina,* and *Adenostoma fasciculatum. Yucca whipplei* and *Rhus ovata* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Quercus lobata* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis. Bromus madritensis, Cuscuta californica, Brassica nigra,* and *Hirschfeldia incana* may be present.

***Eriogonum fasciculatum-Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	100	9.4	2.0	22.0	X		
	SAME3	*Salvia mellifera*	100	8.5	0.2	17.0	X		
	MALA6	*Malosma laurina*	98	4.8	0.2	12.0	X		
	ADFA	*Adenostoma fasciculatum*	84	1.7	0.2	7.5	X		
	YUWH	*Yucca whipplei*	73	0.9	0.2	4.0			
	RHOV	*Rhus ovata*	57	0.9	0.2	5.0			
	CEME	*Ceanothus megacarpus*	45	1.3	0.2	7.0			
	ARCA11	*Artemisia californica*	39	0.8	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	33	0.8	0.2	7.0			
	LOSC2	*Lotus scoparius*	24	0.3	0.2	4.0			
Herb									
	CEME2	*Centaurea melitensis*	29	0.5	0.2	5.0			X
	AVENA	*Avena*	22	0.4	0.2	7.0			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Bromus diandrus, Avena barbata, Bromus hordeaceus, Brassica, Erodium cicutarium, Melilotus indicus, Pennisetum setaceum, Stellaria media, Avena fatua, Centaurea solstitialis, Cirsium vulgare, Erodium, Marrubium vulgare, Nicotiana glauca, Silybum marianum

Samples Used in Description: (n = 49)
AA0032cc, AA0066cc, AA0247cc, AA0266cc, AA0292cc, AA0298cc, AA0309cc, AA0327cc, AA0401, AA0474cc, AA0683, AA0727, AA0814, AA0850, AA0868, AA0873, AA0966, AA1034, AA1080, AA1105, AA1118, AA1146, AA1167, AA1186, AA1209, rap0124, rap0335, rap0415, rap0745, rap0826, rap0829, rap0891, rap0947, rap1208, rap1226, rap1443, rap1574, rap1717, rap1921, rap2040, rap2042, rap2230, rap2261, rap2357, rap2428, rap2430, rap2439, rap2743, rap2758

Comments:
This association is the analog to the *Encelia californica-Salvia mellifera-Malosma laurina* Association of the *E. californica* Alliance. It is generally found at somewhat higher elevations than that association and may be more likely to occur in stands adjacent to chaparral alliance stands such as *Ceanothus megacarpus* and *Adenostoma fasciculatum* than its *Encelia californica* Alliance analog.

Phases:
None

COMMON NAME	California Buckwheat-Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland

PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is not known outside of the study area; however, it may occur elsewhere in coastal southern California below 1,000 m in elevation.

References:
None

Eriogonum fasciculatum-Salvia apiana Shrubland Alliance

California Buckwheat-White Sage Shrubland Alliance

Mapping Code: 3410

Local Description

Summary:
This shrubland alliance occurs on somewhat steep to very steep southeast- or southwest-facing slopes at low elevations between 202–262 m. It is codominated by *Salvia apiana* and *Eriogonum fasciculatum* in the shrub layer and has a variety of native and nonnative herbs, all at low cover in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in 80% of the sampled stands.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 202–262 m, mean 232.4 m
Aspect: southeast and southwest
Slope: range 15–50 degrees, mean 34 degrees
Topography (micro; macro): undulating; lower to middle slope
Litter Cover: 15%
Small Rock Cover: range 5–45%, mean 25%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 20–45%, mean 32.5%
Parent Material: sedimentary, quaternary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of this shrubland alliance form an open shrub layer (10–29%, mean 18.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (3–30%, mean 13%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 1%) with hardwoods at 0–10 m tall. Total vegetation cover is 23–45%, mean cover is 32.6%.

In this alliance, the shrub layer is characterized by *Salvia apiana* and *Eriogonum fasciculatum*. *Yucca whipplei* is also characteristic but at very low cover values. *Artemisia californica* is occasionally included in this layer as are *Malosma laurina, Brickellia californica, Eriogonum cinereum, Salvia leucophylla,* and *Adenostoma fasciculatum*. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and is characterized by low cover of *Avena* sp. Other herbs sometimes include *Centaurea melitensis, Brassica nigra, Hirschfeldia incana,* and *Dudleya pulverulenta*.

Eriogonum fasciculatum-Salvia apiana Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	80	1.0	0.2	3.0	X	X	
Shrub									
	SAAP2	*Salvia apiana*	100	9.2	3.0	16.0	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	6.2	0.2	14.0	X	X	
	YUWH	*Yucca whipplei*	100	0.9	0.2	2.0		X	
	ARCA11	*Artemisia californica*	60	1.0	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	40	0.4	0.2	2.0			
	SALE3	*Salvia leucophylla*	40	0.2	0.2	1.0			
	ADFA	*Adenostoma fasciculatum*	40	0.1	0.2	0.2			
	BRCA3	*Brickellia californica*	40	0.1	0.2	0.2			
	MALA6	*Malosma laurina*	40	0.1	0.2	0.2			
	CEBE3	*Cercocarpus betuloides*	20	0.4	2.0	2.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.2	1.0	1.0			
	RHIL	*Rhamnus ilicifolia*	20	0.2	1.0	1.0			
	MILA6	*Mirabilis laevis*	20	0.0	0.2	0.2			
	QUBE5	*Quercus berberidifolia*	20	0.0	0.2	0.2			
	RHOV	*Rhus ovata*	20	0.0	0.2	0.2			
	SAME5	*Sambucus mexicana*	20	0.0	0.2	0.2			
Herb									
	AVENA	*Avena*	80	2.2	0.2	8.0		X	X
	CEME2	*Centaurea melitensis*	60	4.6	1.0	14.0	X		X
	BRNI	*Brassica nigra*	60	1.8	1.0	4.0			X
	HIIN3	*Hirschfeldia incana*	40	1.2	0.2	6.0			X
	DUPU	*Dudleya pulverulenta*	40	0.1	0.2	0.2			
	SIMA3	*Silybum marianum*	20	0.8	4.0	4.0			X
	BROMU	*Bromus*	20	0.4	2.0	2.0			
	BRMA3	*Bromus madritensis*	20	0.4	2.0	2.0			X
	VULPI	*Vulpia*	20	0.4	2.0	2.0			
	BRDI3	*Bromus diandrus*	20	0.2	1.0	1.0			X
	CUCA	*Cuscuta californica*	20	0.2	1.0	1.0			
	LAPL	*Layia platyglossa*	20	0.2	1.0	1.0			
	MEIM	*Melica imperfecta*	20	0.2	1.0	1.0			
	UNBG	Unknown bunch grass	20	0.2	1.0	1.0			
	CAEX14	*Castilleja exserta*	20	0.0	0.2	0.2			
	CHGL	*Chaenactis glabriuscula*	20	0.0	0.2	0.2			
	ERIN8	*Erysimum insulare*	20	0.0	0.2	0.2			
	GALIU	*Galium*	20	0.0	0.2	0.2			
	LUPIN	*Lupinus*	20	0.0	0.2	0.2			
	STEPH	*Stephanomeria*	20	0.0	0.2	0.2			
Cryptogam									
	SEBI	*Selaginella bigelovii*	20	0.0	0.2	0.2			

Other Noteworthy Species:
Erysimum insulare was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and

state listing is none (SAMO 2004).

Nonnative Species:
Avena, Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Silybum marianum, Bromus madritensis, Bromus diandrus

Samples Used in Description: (n = 5)
AA1135, rap2305, rap2432, rap2436, rap2910

Comments:
This alliance is characteristic of the inland portions of the Los Angeles Basin and San Diego County. It is less frequent in the Coastal Fog Zone of southern California; hence, it is a relative rarity locally. The local stands appear to be restricted to the inland side of the crest of the Santa Monica Mountains in relatively xeric settings.

Phases:
None

COMMON NAME	California Buckwheat-White Sage Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Eriogonum fasciculatum-Salvia apiana* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This alliance occurs within the portions of southern California and Baja California, Mexico, bounded by the San Bernardino Mountains to the north and the Peninsular Ranges to the east.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
Stands of this shrubland alliance of southern California and Baja California occur on south-facing slopes from 500 to 1,500 m elevation. Mean annual precipitation ranges from 35 cm in the northern end of the range (Los Angeles Basin) to 20 cm in the southern (Baja California) portion.

The most favorable habitat is uplands with shallow soils and boulders. Stands intergrade with other chaparral alliances and with other "coastal sage scrub" vegetation types.

Vegetation Description:
This mid elevation variety of southern California sage scrub is characterized by codominance of *Salvia apiana* and *Eriogonum fasciculatum*, each attaining about 20% cover. Other components of this sclerophyllous evergreen alliance often include *Adenostoma fasciculatum, Yucca whipplei, Ceanothus leucodermis, Ceanothus greggii, Lotus scoparius*, and *Quercus berberidifolia*. Emergent individuals of *Quercus agrifolia* may be present. The herbaceous layer is variable and may be composed of graminoid species.

Comments:
This alliance is known to be very common in the western granitic foothills (subsection M262Bn) of western Riverside County (Klein and Evens 2005) and San Diego County (Evens and San 2005).

References:
Evens and San 2005, Klein and Evens 2005, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata Shrubland Association

Sawtooth Goldenbush/Purple Needlegrass-Clustered Tar Plant Shrubland Association
***Hazardia squarrosa* Shrubland Alliance**
Sawtooth Goldenbush Shrubland Alliance

Mapping Code: 3263

Local Description

Summary:
This shrubland association occurs on gentle to somewhat steep northeast-facing slopes at low elevations between 6–486 m. It is characterized by the dominance of *Hazardia squarrosa* in the shrub layer and *Nassella pulchra and Hemizonia fasciculata* in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Dry Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 6–486 m, mean 225 m
Aspect: northeast
Slope: range 5–25 degrees, mean 14.3 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: range 20–85%, mean 39.2%
Small Rock Cover: range 0–10%, mean 4%
Large Rock Cover: range 0–2%, mean 0.4%
Bare Ground: range 6–55%, mean 24.8%
Parent Material: sedimentary
Soil Texture: moderately fine to fine clay

Vegetation Description:
Stands of *Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Shrubland form an open to intermittent shrub layer (7–48%, mean 22.2%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–2 m tall. The herbaceous layer is open to intermittent 9–37%, mean 22.5%) at 0–1 m tall. Trees are not present. Total vegetation cover is 30–72%, mean cover is 44.4%.

In this association, the shrub layer is characterized by *Hazardia squarrosa* and *Salvia leucophylla. Artemisia californica* is frequently included in this layer. Other shrubs sometimes include *Baccharis pilularis, Eriogonum cinereum, Yucca whipplei,* and *Eriophyllum confertiflorum*. The tree layer is absent. The herbaceous layer is simple and is characterized by *Hemizonia fasciculata* with *Nassella pulchra* often present. Other herbs sometimes include *Centaurea melitensis, Sisyrinchium bellum, Brassica nigra,* and *Bromus madritensis.*

***Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	100	13.4	3.0	29.0	X	X	
	SALE3	*Salvia leucophylla*	82	1.9	0.2	7.0		X	
	ARCA11	*Artemisia californica*	64	1.2	0.2	3.0			
	BAPI	*Baccharis pilularis*	36	0.9	1.0	4.0			
	ERCO25	*Eriophyllum confertiflorum*	27	0.7	0.2	6.0			
	ERCI5	*Eriogonum cinereum*	27	0.3	0.2	2.5			
	YUWH	*Yucca whipplei*	27	0.1	0.2	1.0			
Herb									
	HEFA	*Hemizonia fasciculata*	82	4.9	1.0	23.0		X	
	NAPU4	*Nassella pulchra*	73	9.3	0.2	25.0	X		
	CEME2	*Centaurea melitensis*	36	1.1	0.2	6.0			X
	SIBE	*Sisyrinchium bellum*	36	0.4	0.2	3.0			
	BRNI	*Brassica nigra*	36	0.2	0.2	1.0			X
	BRMA3	*Bromus madritensis*	36	0.1	0.2	1.0			X
	DICA14	*Dichelostemma capitatum*	27	0.7	0.2	4.0			
	BRHO2	*Bromus hordeaceus*	27	0.4	0.2	2.5			X

Other Noteworthy Species:
Calochortus catalinae was found in 2 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Bromus hordeaceus, Erodium cicutarium, Avena, Anagallis arvensis, Lactuca serriola, Bromus diandrus, Hirschfeldia incana, Stellaria media, Avena fatua, Erodium, Melilotus indicus, Nicotiana glauca, Phalaris aquatica, Sonchus

Samples Used in Description: (n = 11)
AA0122cc, AA1164, rap0987, rap0994, rap2162, rap2196m, rap2309, rap2633, rap2634, rap2805, rap2872rlv

Comments:
This association is indicative of a transitional state between herb-dominated grassland where presumably *Nassella pulchra* and *Hemizonia fasciculata* were among the principal species and various shrublands in the *Artemisia californica* and *Salvia leucophylla* alliances. *Hazardia squarrosa* is a common, early seral species that does well following mechanical disturbance or fire. The stability of these stands is something that should be investigated. They tend to have a higher native herbaceous component than many other shrublands in the study area. In some cases, these stands may be transitioning into denser coastal scrub; however, the stands that are in heavy clay appear to be stable.

Phases:
Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata (Sawtooth Goldenbush/Purple Needlegrass-Clustered Tar Plant) Phase [3263]

COMMON NAME	Sawtooth Goldenbush/Purple Needlegrass-Clustered Tar Plant Shrubland Association
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Hazardia squarrosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Hazardia squarrosa-Artemisia californica Shrubland Association

Sawtooth Goldenbush-California Sagebrush Shrubland Association
***Hazardia squarrosa* Shrubland Alliance**
Sawtooth Goldenbush Shrubland Alliance

Mapping Code: 3262

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northwest- and northeast-facing slopes at low elevations between 30–542 m. It is characterized by a dominance of *Hazardia squarrosa* and a subdominance of *Artemisia californica* in the shrub layer. In the herbaceous layer, there is a mixture of several native and nonnative species, none of which are particularly characteristic. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Dry Inland, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 30–542 m, mean 335.5 m
Aspect: northwest and northeast
Slope: range 8–35 degrees, mean 23.2 degrees
Topography (micro; macro): flat, convex, or undulating; lower to upper slope
Litter Cover: range 10–65%, mean 28.8%
Small Rock Cover: range 0–35%, mean 10.6%
Large Rock Cover: range 0–4%, mean 0.4%
Bare Ground: range 3–79%, mean 44.5%
Parent Material: sedimentary
Soil Texture: fine clay

Vegetation Description:
Stands of *Hazardia squarrosa-Artemisia californica* Shrubland form an open to intermittent shrub layer (6–50%, mean 27.8%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (1–42%, mean 13.8%) at 0–1 m tall. Trees are occasionally emergent (0–7% cover, mean 0.7%) with conifers at 0–1 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 23–60%, mean cover is 42.2%.

In this association, the shrub layer is characterized by *Hazardia squarrosa. Artemisia californica* and *Salvia leucophylla* are frequently included in this layer. Other shrubs sometimes include *Baccharis pilularis, Mimulus aurantiacus,* and *Eriogonum cinereum*. The tree layer is emergent and open and infrequently includes *Quercus lobata* and *Juglans californica* at low cover. The herbaceous layer is diverse and often includes *Leymus condensatus* and *Brassica nigra*. Other herbs sometimes include *Avena fatua, Hirschfeldia incana, Bromus diandrus, Centaurea melitensis,* and *Bromus hordeaceus.*

***Hazardia squarrosa-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	100	18.8	2.5	35.0	X	X	
	ARCA11	*Artemisia californica*	72	3.5	0.2	20.0			
	SALE3	*Salvia leucophylla*	66	0.9	0.2	6.0			
	BAPI	*Baccharis pilularis*	31	0.5	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	21	0.9	0.2	10.0			
	ERCI5	*Eriogonum cinereum*	21	0.5	0.2	5.0			
Herb									
	LECO12	*Leymus condensatus*	52	1.0	0.2	10.0			
	BRNI	*Brassica nigra*	48	1.1	0.2	6.0			X
	AVFA	*Avena fatua*	34	1.3	0.2	15.0			X
	HIIN3	*Hirschfeldia incana*	34	0.6	0.2	4.0			X
	BRDI3	*Bromus diandrus*	31	0.8	0.2	8.0			X
	CEME2	*Centaurea melitensis*	31	0.7	0.2	11.0			X
	AMME	*Amsinckia menziesii*	24	0.7	0.2	14.0			
	BRHO2	*Bromus hordeaceus*	24	0.6	1.0	4.0			X
	LEFI11	*Lessingia filaginifolia*	24	0.3	0.2	4.0			
	HEFA	*Hemizonia fasciculata*	24	0.3	0.2	4.0			
	AVENA	*Avena*	21	1.1	0.2	15.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 4 of 29 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 4 of 29 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Avena fatua, Hirschfeldia incana, Bromus diandrus, Centaurea melitensis, Bromus hordeaceus, Avena, Lolium, Lactuca serriola, Bromus madritensis, Erodium cicutarium, Cirsium vulgare, Galium aparine, Melilotus indicus, Sonchus oleraceus, Avena barbata, Foeniculum vulgare, Acacia redolens, Phalaris aquatica, Anagallis arvensis, Centaurea solstitialis, Euphorbia terracina, Medicago polymorpha, Silybum marianum

Samples Used in Description: (n = 29)
AA0118cc, AA0257cc, AA0323cc, AA0988, rap0061, rap0105, rap0510, rap1259, rap1394, rap1441, rap1504, rap1846, rap1850, rap1874, rap1882, rap1883, rap1884, rap1942, rap1944, rap1946, rap2017, rap2235, rap2236, rap2310, rap2797, rap2809, rap2837, rap2838, rap2874rlv

Comments:
In contrast with the previous association of the *Hazardia squarrosa* Alliance, this type does not usually contain high cover of native perennial bunch grasses. It tends to be "weedier" with a higher percentage of nonnative species and higher cover of other shrubs such as *Artemisia californica* and *Salvia leucophylla*. However, in some cases, *Artemisia* cover will be rather low,

and the stand will be dominated by only *Hazardia* and nonnative herbs. These characteristics suggest either a stronger transition toward longer-persisting shrublands of the *Artemisia californica* Alliance or a successional stage developing from a more heavily disturbed annual grassland. These two trends are reflected in the two phases mentioned below.

Phases:
Hazardia squarrosa/Annual Grass-Herb (Sawtooth Goldenbush/Annual Grass-Herb) Phase [3261]
Hazardia squarrosa-Artemisia californica/Leymus condensatus (Sawtooth Goldenbush–California Sagebrush/Giant Wild Rye) Phase [3262]

COMMON NAME	Sawtooth Goldenbus-California Sagebrush Shrubland Association
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Hazardia squarrosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is not known beyond the SAMO study area but could occur up and down the southern California coastline.

References:
None

Heteromeles arbutifolia-Malosma laurina Shrubland Association

Toyon-Laurel Sumac Shrubland Association
***Heteromeles arbutifolia* Shrubland Alliance**
Toyon Shrubland Alliance

Mapping Code: 2138

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep northeast- and northwest-facing slopes at low elevations between 50–584 m. It is characterized by a dominance of *Heteromeles arbutifolia* with a subdominance of *Malosma laurina* and several other species of lower average cover in the shrub layer. The herbaceous layer is not well characterized. The emergent tree layer occasionally includes both *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Immediate Coast, Dry Inland, Western Fog Zone, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 50–584 m, mean 298.5 m
Aspect: northeast and northwest
Slope: range 15–55 degrees, mean 31.8 degrees
Topography (micro; macro): variable (all); lower to upper
Litter Cover: range 25–65%, mean 41.9%
Small Rock Cover: range 0–35%, mean 13.7%
Large Rock Cover: range 0–10%, mean 1.9%
Bare Ground: range 10–53%, mean 31%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Heteromeles arbutifolia-Malosma laurina* Shrubland form an open to intermittent shrub layer (14–63%, mean 42.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–10 m tall. The herbaceous layer is open (0–26%, mean 4.7%) at 0–2 m tall. Trees are occasionally emergent (0–42% cover, mean 3.7%) with conifers at 0–20 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 30–65%, mean cover is 50%.

In this association, the shrub layer is characterized by *Heteromeles arbutifolia* and *Malosma laurina. Rhus ovata, Ceanothus spinosus, Cercocarpus betuloides,* and *Sambucus mexicana* are often included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus, Marah macrocarpus,* and *Marrubium vulgare.*

***Heteromeles arbutifolia-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	49	1.9	0.2	10.0			
	JUCA-T	*Juglans californica*	20	0.3	0.2	4.0			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	100	16.9	2.0	63.0	X		
	MALA6	*Malosma laurina*	82	5.0	0.2	25.0	X		
	RHOV	*Rhus ovata*	55	2.5	0.2	19.0			
	CEBE3	*Cercocarpus betuloides*	53	2.5	0.2	15.0			
	CESP	*Ceanothus spinosus*	53	1.7	0.2	14.0			
	SAME5	*Sambucus mexicana*	51	0.9	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	47	1.8	0.2	13.0			
	SAME3	*Salvia mellifera*	44	1.9	0.2	14.0			
	ARCA11	*Artemisia californica*	44	1.6	0.2	15.0			
	CEME	*Ceanothus megacarpus*	38	0.8	0.2	7.0			
	ADFA	*Adenostoma fasciculatum*	33	0.8	0.2	7.0			
	RHIN2	*Rhus integrifolia*	31	1.2	0.2	12.0			
	QUBE5	*Quercus berberidifolia*	29	0.5	0.2	4.0			
Herb									
	BRNI	*Brassica nigra*	25	0.4	0.2	6.0		X	
	LECO12	*Leymus condensatus*	22	0.6	0.2	7.5			
	POACXX	*Poaceae*	20	1.6	0.2	25.0			

Other Noteworthy Species:
Juglans californica was found in 15 of 55 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Nicotiana glauca, Bromus madritensis, Marrubium vulgare, Bromus diandrus, Ricinus communis, Cortaderia, Erodium, Centaurea melitensis, Galium aparine, Foeniculum vulgare, Hirschfeldia incana, Eucalyptus, Avena fatua, Ageratina adenophora, Schinus molle, Spartium junceum, Arundo donax, Cotoneaster, Erodium cicutarium, Lantana montevidensis, Malva parviflora, Melilotus indicus, Nerium oleander, Olea europaea, Stellaria media

Samples Used in Description: (n = 55)
AA0026cc, AA0073cc, AA0157cc, AA0160cc, AA0190cc, AA0308cc, AA0455cc, AA0479cc, AA0512, AA0807, AA0933, AA0971, AA1031, AA1147, AA1172, rap0607, rap0614, rap0622, rap0631, rap0697, rap0698, rap0699, rap0720, rap0721m, rap0723, rap0727m, rap0750m, rap0761, rap0801m, rap0802, rap0856m, rap0897m, rap0911, rap0957, rap1038, rap1173m, rap1286, rap1355m, rap1356m, rap1359, rap1721m, rap1833, rap1988, rap2023, rap2238m, rap2453, rap2454, rap2493, rap2494, rap2571, rap2579, rap2621, rap2654, rap2714, rap2770

Comments:
This is a heterogeneous, generally mesic chaparral association dominated by toyon (*Heteromeles arbutifolia*). Its heterogeneity is indicated by the distinguishing of five phases (see below). All of these phases tend to occur on northerly facing steep slopes and share a number of species. The differences between them appear to be mostly related to site history (largely time since last fire

and frequency of fires) and proximity to different adjacent alliances, which may contribute to the higher or lower cover of associated species. In many cases, these stands were seen on small fragments of open space in highly developed areas where fires are rare but human disturbance is high.

Phases:
Heteromeles arbutifolia (Toyon-Coast Live Oak) Phase [2137]
Heteromeles arbutifolia-Salvia mellifera (Toyon-Black Sage Sumac) Phase [2133]
Heteromeles arbutifolia-Cercocarpus betuloides (Toyon-Birch Leaf Mountain Mahogany) Phase [2136]
Heteromeles arbutifolia-Malosma laurina (Toyon-Laurel Sumac) Phase [2138]
Heteromeles arbutifolia-Artemisia californica-Mimulus aurantiacus (Toyon-California Sagebrush-Bush Monkey Flower) Phase [2135]

COMMON NAME	Toyon-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Heteromeles arbutifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur throughout much of cismontane central and southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Two other associations of the *Heteromeles arbutifolia* Alliance have been described from western Riverside County (Klein and Evens 2005). They are the *Heteromeles arbutifolia-Artemisia*

californica Association, where *Artemisia californica* codominates with *Heteromeles arbutifolia* in the shrub overstory, and the *Heteromeles arbutifolia-Quercus berberidifolia-Cercocarpus betuloides-Fraxinus dipetala* Association, where *Quercus berberidifolia*, *Fraxinus dipetala*, and *Cercocarpus betuloides* are characteristically present as codominant or subdominant shrubs. Borchert et al. 2004 describe a *Heteromeles arbutifolia-Prunus ilicifolia* Alliance from the Los Padres National Forest of southern and central coastal California. It has similarities with this association but has much higher average cover of *Prunus ilicifolia*.

References:
Borchert et al. 2004, Klein and Evens 2005

Lepidospartum squamatum Shrubland Alliance

Scale Broom Shrubland Alliance

Mapping Code: 2220

Local Description

Summary:
One example of this shrubland alliance occurs on a gentle slope at 311 m elevation. It is dominated by *Lepidospartum squamatum* in the shrub layer and has a variety of native and nonnative species at low cover in the herbaceous layer. The emergent tree layer includes *Platanus racemosa*.

Distribution:
This alliance is sampled in the Simi Hills Inland region of the study area.

Environmental Description:
Elevation: 311 m
Aspect: flat
Slope: 2 degrees
Topography (micro; macro): flat; bottom slope
Litter Cover: no data
Small Rock Cover: 30%
Large Rock Cover: 10%
Bare Ground: 40%
Parent Material: sedimentary
Soil Texture: coarse loamy sand

Vegetation Description:
One stand of this shrubland alliance forms an open shrub layer (18%). Shrubs occur in two different strata with low shrubs at 0–0.5 m tall and tall shrubs at 0.5–1 m tall. The herbaceous layer is open (5%) at 0.1–0.5 m tall. Trees are occasionally emergent (< 1%) with hardwoods at 1–10 m tall. Total vegetation cover is 23%.

In this alliance, the shrub layer is characterized by *Lepidospartum squamatum*. *Eriogonum fasciculatum* and *Baccharis salicifolia* are also included in this layer. The tree layer is emergent and open and includes *Platanus racemosa* at low cover. The herbaceous layer is simple, and the nonnative *Hirschfeldia incana* is the most abundant. Other herbs include *Centaurea melitensis* and *Artemisia douglasiana*.

Lepidospartum squamatum Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	0.2	0.2	0.2	X	X	
Shrub									
	LESQ	*Lepidospartum squamatum*	100	16.0	16.0	16.0	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	3.0	3.0	3.0		X	
	BASA4	*Baccharis salicifolia*	100	1.0	1.0	1.0		X	
	YUWH	*Yucca whipplei*	100	0.2	0.2	0.2		X	
Herb									
	HIIN3	*Hirschfeldia incana*	100	2.0	2.0	2.0	X	X	X
	UNGR	Unknown annual grass	100	1.0	1.0	1.0		X	
	ARDO3	*Artemisia douglasiana*	100	0.2	0.2	0.2		X	
	CEME2	*Centaurea melitensis*	100	0.2	0.2	0.2		X	X
	CLARK	*Clarkia*	100	0.2	0.2	0.2		X	
	CRYPT	*Cryptantha*	100	0.2	0.2	0.2		X	

Other Noteworthy Species:
None

Nonnative Species:
Hirschfeldia incana, Centaurea melitensis

Samples Used in Description: (n = 1)
rap2680

Comments: This alliance is represented in the study area only in a few alluvial settings. It is more common inland from the study area in the Los Angeles Basin and other south coastal drainages.

Phases:
None

COMMON NAME	Scale Broom Alliance
SYNONYM	Riverdisian Alluvial Fan Sage Scrub (in part) Holland (1986)
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.4.N.b. Intermittently flooded microphyllous shrubland
ALLIANCE	*Lepidospartum squamatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	The alliance is considered a G4S4, but several associations are ranked as Rare.

Global Description

Distribution:
The alliance ranges from central coastal California (western Stanislaus County) south through the California coast ranges and the far southern Sierra Nevada foothills to the western Mojave Desert and south to coastal Baja California, Mexico.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
This shrubland alliance of the arid southwest is found on rarely flooded, low-gradient deposits along streams. Substrates are usually rocky with little soil. Elevations range from sea level to 1,800 m. Annual precipitation is quite variable and episodic but rarely exceeds 30 cm. Summer temperatures are very hot, and some areas in the Mojave may exceed 30 degrees Celsius for many days in the summer.

Vegetation Description:
Stands of this desert streamside shrubland contain *Lepidospartum squamatum* as a dominant or important species in the shrub layer. Other shrubs present may include *Rhus trilobata, Artemisia tridentata, Artemisia californica, Acacia greggii, Cercocarpus montanus* var. *glaber, Isomeris arboreus, Encelia farinosa, Eriogonum fasciculatum, Hymenoclea salsola, Yucca whipplei, Lotus scoparius, Eriodictyon crassifolium, Baccharis salicifolia, Toxicodendron diversilobum, Opuntia* spp., and *Rhus ovata*. Emergent individuals of *Juniperus californica, Platanus racemosa, Juglans californica* var. *californica, Populus fremontii, Malosma laurina, Rhus integrifolia,* and *Sambucus mexicana* may be present. Two rare forbs, *Dodecahema leptocerus* and *Eriastrum densifolium* subsp. *sanctorum,* are often associated with stands of this alliance in the eastern Los Angeles Basin.

Comments:
Cycles of drought and flood shape this alliance. Periodic disturbances such as floods and fires remove shrubs and trees. If stands are not disturbed for a long period of time, emergent trees gradually take over this shrubland. This alliance is much reduced in extent in the southern portion of its range by flood control projects and other development.

References:
Barbour and Wirka 1997, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Lotus scoparius Shrubland Association

Deerweed Shrubland Association
***Lotus scoparius* Shrubland Alliance**
Deerweed Shrubland Alliance

Mapping Code: 3270

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 24–539 m. It is characterized by the dominance of *Lotus scoparius* in the shrub layer and a variety of mostly nonnative herbs, none particularly characteristic, in the herbaceous layer. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Dry Inland, Immediate Coast, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 24–539 m, mean 336.8 m
Aspect: variable
Slope: range 2–38 degrees, mean 24.5 degrees
Topography (micro; macro): undulating, convex, or flat; middle to upper slope
Litter Cover: range 20–65%, mean 37%
Small Rock Cover: range 1–60%, mean 23.6%
Large Rock Cover: range 0–25%, mean 3.8%
Bare Ground: range 5–60%, mean 28.4%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Lotus scoparius* Shrubland form an open to intermittent shrub layer (4–50%, mean 26.7%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–42%, mean 8.4%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.2%) with hardwoods at 0–5 m tall. Total vegetation cover is 13–68%, mean cover is 35.2%.

In this association, the shrub layer is characterized by *Lotus scoparius. Salvia mellifera*, *Eriogonum fasciculatum, Artemisia californica, Malosma laurina,* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Centaurea melitensis, Hirschfeldia incana, Brassica nigra,* and *Bromus madritensis.*

***Lotus scoparius* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	LOSC2	*Lotus scoparius*	100	13.4	1.0	28.0	X		
	SAME3	*Salvia mellifera*	60	1.5	0.2	8.0			
	ARCA11	*Artemisia californica*	56	2.6	0.2	15.0			
	MALA6	*Malosma laurina*	56	0.9	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	56	0.7	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	52	1.1	0.2	6.0			
	MAFA	*Malacothamnus fasciculatus*	36	1.9	2.0	16.0			
	HASQ2	*Hazardia squarrosa*	28	0.8	0.2	5.0			
	SALE3	*Salvia leucophylla*	24	0.7	0.2	7.5			
	CEME	*Ceanothus megacarpus*	24	0.3	0.2	3.0			
	YUWH	*Yucca whipplei*	24	0.1	0.2	1.0			
	ERCI5	*Eriogonum cinereum*	20	0.8	1.0	10.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.3	0.2	4.0			
Herb									
	CEME2	*Centaurea melitensis*	36	0.2	0.2	2.0			X
	HIIN3	*Hirschfeldia incana*	32	1.0	0.2	7.0			X
	BRNI	*Brassica nigra*	32	0.5	0.2	3.0			X
	BRMA3	*Bromus madritensis*	32	0.3	0.2	2.0			X
	BROMU	*Bromus*	20	1.0	0.2	10.0			
	AVFA	*Avena fatua*	20	1.0	0.2	10.0			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 2 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Bromus madritensis, Avena fatua, Avena, Bromus hordeaceus, Erodium cicutarium, Erodium, Foeniculum vulgare, Euphorbia terracina, Bromus diandrus, Erodium moschatum, Anagallis arvensis, Avena barbata, Brassica, Carduus pycnocephalus, Dactylis glomerata, Erodium botrys, Hypochaeris, Piptatherum miliaceum, Sonchus, Sonchus oleraceus

Samples Used in Description: (n = 25)
AA0007cc, AA0424, AA0675, AA0795, AA1129, rap0339, rap0365m, rap0462, rap0565, rap1093, rap1149, rap1462, rap1875m, rap1936, rap2019, rap2095, rap2102, rap2104, rap2218, rap2358, rap2489, rap2813, rap2847, rap2848, rap2875rlv

Comments:
This is one of the classic seral shrub associations throughout much of central and southern California. It is characteristic of postfire chaparral and coastal sage scrub. There seems to be no

strong reason to further subdivide this association based on short-term differences in subdominant species. The main characteristic of this association is that it reflects a short-term, postfire condition. It has a variety of weakly distinguishable phases that reflects the original prefire vegetation. In general, the phases reflect either a chaparral (e.g., *Adenostoma fasciculatum*) prefire setting or a coastal sage (e.g., *Artemisia californica*) prefire setting.

Phases:
Lotus scoparius-Artemisia californica/Annual Grass-Herb (Deerweed-California Sagebrush/Annual Grass-Herb) Phase [3273]
Lotus scoparius-Malacothamnus fasciculatus-Adenostoma fasciculatum-Salvia mellifera (Deerweed-Bush Mallow-Chamise-Black Sage) Phase [3272]

COMMON NAME	Deerweed Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Lotus scoparius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. However, it is likely to occur throughout much of California (e.g., south coast and peninsular ranges, Anza-Borrego Desert, Sierra Nevada foothills, and central and inner north coast ranges).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus Shrubland Association

Bush Mallow Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3287

Local Description

Summary:
This shrubland association occurs on gentle to steep southwest- and southeast-facing slopes at low elevations between 0–483 m. It is characterized by a strong dominance of *Malacothamnus fasciculatus* in the shrub layer. The herbaceous layer is generally insignificant and composed of mostly fire-following natives or widespread nonnative weedy species. The emergent tree layer is generally absent but may include *Quercus agrifolia, Juglans californica,* and *Platanus racemosa*.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–483 m, mean 304 m
Aspect: southwest and southeast
Slope: range 2–35 degrees, mean 23.5 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 20–50%, mean 35%
Small Rock Cover: range 10–45%, mean 21.4%
Large Rock Cover: range 0–1%, mean 0.6%
Bare Ground: range 14–60%, mean 32.7%
Parent Material: sedimentary and igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus* Shrubland form an open to intermittent shrub layer (12–54%, mean 34.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–22%, mean 5.3%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 26–55%, mean cover is 40.4%.

In this association, the shrub layer is characterized by *Malacothamnus fasciculatus*, with *Salvia mellifera* often present. *Artemisia californica, Malosma laurina, Encelia californica,* and *Ceanothus megacarpus* are sometimes included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia, Juglans californica,* and *Platanus racemosa* at low cover. The herbaceous layer is simple and may include *Centaurea melitensis, Brassica nigra, Bromus diandrus, Hirschfeldia incana,* and *Hemizonia fasciculata.*

***Malacothamnus fasciculatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	27.2	6.0	48.0	X	X	
	SAME3	*Salvia mellifera*	58	1.1	0.2	5.0			
	ARCA11	*Artemisia californica*	35	0.4	0.2	3.0			
	MALA6	*Malosma laurina*	31	1.0	1.0	8.0			
	ENCA	*Encelia californica*	31	0.6	0.2	5.0			
	CEME	*Ceanothus megacarpus*	27	0.8	1.0	6.0			
	SALE3	*Salvia leucophylla*	27	0.6	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	27	0.5	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	27	0.3	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	27	0.3	0.2	2.5			
	RHOV	*Rhus ovata*	23	0.4	0.2	5.0			
	LOSC2	*Lotus scoparius*	23	0.1	0.2	1.0			
Herb									
	CEME2	*Centaurea melitensis*	35	0.3	0.2	3.0			X
	BRNI	*Brassica nigra*	31	0.5	0.2	6.0			X

Other Noteworthy Species:
Juglans californica was found in 3 of 26 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus diandrus, Hirschfeldia incana, Bromus madritensis, Avena fatua, Melilotus indicus, Avena, Avena barbata, Brassica, Carduus pycnocephalus, Pennisetum setaceum, Piptatherum miliaceum

Samples Used in Description: (n = 26)
AA0381cc, AA0421, AA0626, AA0629, AA0678, AA0681, AA1072, AA1077, AA1099, AA1130, AA1165, AA1166, rap0513, rap0563, rap1185, rap1220, rap1432, rap1530m, rap1599, rap1710, rap1725, rap1727m, rap1728, rap1832, rap2026, rap2065

Comments:
This is the first project in which this alliance has been defined. It is a seral, postfire alliance distinguished by the dominance or codominance of the short-lived tall shrub *Malacothamnus fasciculatus.* The diversity of associations defined in the SAMO study area is indicative of the diversity of recent postfire settings in chaparral and coastal sage scrub in these mountains. This association is the most pure expression of the alliance. In this association, the variety of associated shrub species is almost equally derived from chaparral and coastal sage scrub vegetation (though none are strongly represented at high frequency or cover). Thus, this association may be the result of fire having burned through a stand of chaparral or coastal sage scrub without a large component of resprouting shrubs or where the obligate seeding species other than *M. fasciculatus* had less than favorable postfire germination.

Phases:
None

COMMON NAME	Bush Mallow Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	61Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus-Ceanothus megacarpus Shrubland Association

Bush Mallow-Big Pod Ceanothus Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3288

Local Description

Summary:
This shrubland association occurs on moderate to very steep slopes of variable aspect at low elevations between 139–467 m. It is characterized by a codominance of *Malacothamnus fasciculatus* and *Ceanothus megacarpus* in the shrub layer. The simple herbaceous layer is not distinctive. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 139–467 m, mean 309.9 m
Aspect: variable
Slope: range 12–48 degrees, mean 28.3 degrees
Topography (micro; macro): variable (all); bottom to middle slope
Litter Cover: range 15–50%, mean 32.5%
Small Rock Cover: range 10–20%, mean 13.3%
Large Rock Cover: range 0–3%, mean 1%
Bare Ground: range 40–57%, mean 49%
Parent Material: igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Ceanothus megacarpus* Shrubland form an open to intermittent shrub layer (30–57%, mean 45.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–20%, mean 4%) at 0–1 m tall. Trees are not present. Total vegetation cover is 38–57%, mean cover is 49.2%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Malacothamnus fasciculatus, Malosma laurina,* and *Salvia mellifera. Adenostoma fasciculatum* and *Cercocarpus betuloides* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis, Brassica nigra, Bromus diandrus,* and *Bromus madritensis*.

***Malacothamnus fasciculatus-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	22.0	7.0	32.0	X	X	
	MAFA	*Malacothamnus fasciculatus*	100	14.3	5.0	27.0	X	X	
	MALA6	*Malosma laurina*	90	2.9	0.2	16.0		X	
	SAME3	*Salvia mellifera*	80	2.0	0.2	5.0		X	
	CEBE3	*Cercocarpus betuloides*	50	1.4	1.0	5.0			
	ADFA	*Adenostoma fasciculatum*	50	0.5	0.2	3.0			
	ARCA11	*Artemisia californica*	40	0.5	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	40	0.4	0.2	2.5			
	YUWH	*Yucca whipplei*	40	0.4	0.2	2.5			
	RHOV	*Rhus ovata*	40	0.3	0.2	2.0			
	ENCA	*Encelia californica*	40	0.2	0.2	1.0			
	ERFA2	*Eriogonum fasciculatum*	40	0.2	0.2	1.0			
	SALE3	*Salvia leucophylla*	20	0.8	2.5	5.0			
	ERCI5	*Eriogonum cinereum*	20	0.3	1.0	2.0			
	ADSP	*Adenostoma sparsifolium*	20	0.2	0.2	2.0			
	CESP	*Ceanothus spinosus*	20	0.01	0.2	0.2			
	ERCO25	*Eriophyllum confertiflorum*	20	0.01	0.2	0.2			
	LOSC2	*Lotus scoparius*	20	0.01	0.2	0.2			
	SAME5	*Sambucus mexicana*	20	0.01	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	50	0.1	0.2	0.2			X
	BRDI3	*Bromus diandrus*	40	1.6	0.2	15.0			X
	BRNI	*Brassica nigra*	40	0.4	0.2	3.0			X
	BRMA3	*Bromus madritensis*	30	0.1	0.2	0.2			X
	BROMU	*Bromus*	20	0.3	1.0	2.5			
	AVFA	*Avena fatua*	20	0.3	0.2	3.0			X
	AVENA	*Avena*	20	0.3	0.2	2.5			X
	PHCI	*Phacelia cicutaria*	20	0.3	0.2	2.5			
	FOVU	*Foeniculum vulgare*	20	0.1	0.2	1.0			X
	LECO12	*Leymus condensatus*	20	0.01	0.2	0.2			
	MAMA8	*Marah macrocarpus*	20	0.01	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Bromus diandrus, Brassica nigra, Bromus madritensis, Avena fatua, Avena, Foeniculum vulgare, Carduus pycnocephalus, Hirschfeldia incana, Melilotus indicus, Piptatherum miliaceum

Samples Used in Description: (n = 10)
AA0129cc, AA1028, AA1047, rap1222, rap1411m, rap1567, rap1642, rap1652, rap1692, rap2063

Comments:
In keeping with the discussion under the local comments of the *Malacothamnus fasciculatus* Association of this alliance (above), this particular association is reflective of the recent postfire settings where *Ceanothus megacarpus* is the principal reseeding native shrub. Most

Malacothamnus fasciculatus individuals in these stands will be crowded out and shade suppressed by the longer-lived and more broadly spreading *C. megacarpus* within a decade of the fire event.

The general decision was made in the classification of this alliance to include codominant shrub species of either the respective chaparral or coastal sage scrub analog alliances (e.g., *Ceanothus megacarpus, C. spinosus, Malosma laurina*, or *Salvia leucophylla*) within the seral *Malacothamnus fasciculatus* Alliance. This was because these situations are all typically short-lived and reflective first of the postfire condition and then of the overall environmental conditions (temperature, moisture, and perhaps soil fertility).

Phases:
None

COMMON NAME	Bush Mallow-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description

References:
None

Malacothamnus fasciculatus-Ceanothus spinosus Shrubland Association

Bush Mallow-Greenbark Ceanothus Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3289

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 179–648 m. It is characterized by codominance of *Malacothamnus fasciculatus* and *Ceanothus spinosus* in the shrub layer. The simple herbaceous layer is not distinctive. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 179–648 m, mean 434.5 m
Aspect: variable
Slope: range 2–35 degrees, mean 20.6 degrees
Topography (micro; macro): concave or undulating; bottom to upper slope
Litter Cover: range 45–60%, mean 52.5%
Small Rock Cover: range 15–50%, mean 27%
Large Rock Cover: range 2–15%, mean 7%
Bare Ground: range 10–35%, mean 21.7%
Parent Material: sedimentary
Soil Texture: no data

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Ceanothus spinosus* Shrubland form an open to intermittent shrub layer (38–60%, mean 49.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–2%, mean 0.5%) at 0–1 m tall. Trees are occasionally emergent (0–6% cover, mean 0.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 41–60%, mean cover is 50.2%.

In this association, the shrub layer is characterized by *Ceanothus spinosus* and *Malacothamnus fasciculatus. Malosma laurina, Heteromeles arbutifolia, Adenostoma fasciculatum,* and *Cercocarpus betuloides* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is simple, and *Leymus condensatus, Marah macrocarpus,* and *Bromus madritensis* are sometimes present.

***Malacothamnus fasciculatus-Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	23	0.5	0.2	6.0			
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	18.5	7.0	33.0	X	X	
	CESP	*Ceanothus spinosus*	100	17.2	2.5	27.0	X	X	
	MALA6	*Malosma laurina*	69	3.2	1.0	9.0			
	HEAR5	*Heteromeles arbutifolia*	69	1.7	0.2	7.0			
	ADFA	*Adenostoma fasciculatum*	62	1.5	0.2	5.0			
	CEBE3	*Cercocarpus betuloides*	54	2.5	0.2	15.0			
	RHOV	*Rhus ovata*	46	1.4	0.2	10.0			
	CEME	*Ceanothus megacarpus*	38	1.1	1.0	7.5			
	SAME3	*Salvia mellifera*	38	1.0	0.2	7.0			
	CECU	*Ceanothus cuneatus*	23	0.5	0.2	5.0			
	PRIL	*Prunus ilicifolia*	23	0.5	0.2	4.0			
	MIAU	*Mimulus aurantiacus*	23	0.3	0.2	2.0			
	ENCA	*Encelia californica*	23	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	23	0.4	1.0	2.5			
	MAMA8	*Marah macrocarpus*	23	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 2 of 13 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Avena, Brassica nigra, Bromus madritensis, Centaurea melitensis, Hirschfeldia incana

Samples Used in Description: (n = 13)
AA0208cc, AA0275cc, AA0475cc, AA0529, rap1212, rap1513m, rap1629, rap1631, rap1649, rap2384, rap2419, rap2627, rap2757

Comments:
This is the most mesic association of the *M. fasciculatus* Alliance. In keeping with the discussion under the local comments of the *Malacothamnus fasciculatus* Association of this alliance (above), this particular association is reflective of the recent postfire settings where *Ceanothus spinosus* is the principal native shrub. Most *Malacothamnus fasciculatus* individuals in these stands will be crowded out and shade suppressed by the longer-lived and more broadly spreading *C. spinosus* within a decade of the fire event.

The general decision was made in the classification of this alliance to include codominant shrub species of either the respective chaparral or coastal sage scrub analog alliances (e.g., *Ceanothus megacarpus, C. spinosus, Malosma laurina*, or *Salvia leucophylla*) within the seral *Malacothamnus fasciculatus* Alliance. This was because these situations are all typically short lived and reflective first of the postfire condition and then of the overall environmental conditions (temperature, moisture, and perhaps soil fertility).

Phases:
None

COMMON NAME	Bush Mallow-Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Since *Ceanothus spinosus* is a facultative resprouter (i.e., it both resprouts and germinates from seed following fires, per Borchert et al. 2004), it would be expected to overtop and shade out *M. fasciculatus* relatively rapidly following fire events. Thus, this association is likely to be even shorter lived than other associations in this alliance.

References:
Borchert et al. 2004

Malacothamnus fasciculatus-Malosma laurina Shrubland Association

Bush Mallow-Laurel Sumac Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3286

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 18–366 m. It is characterized by a codominance of *Malacothamnus fasciculatus* and *Malosma laurina* in the shrub layer. The herbaceous layer often has low cover of *Leymus condensatus.* The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 18–366 m, mean 153.3 m
Aspect: variable
Slope: range 2–40 degrees, mean 16.2 degrees
Topography (micro; macro): variable (all); bottom to middle slope
Litter Cover: range 40–80%, mean 62%
Small Rock Cover: range 0–30%, mean 10.7%
Large Rock Cover: range 0–5%, mean 0.8%
Bare Ground: range 0–35%, mean 16.8%
Parent Material: sedimentary
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Malosma laurina* Shrubland form an open to intermittent shrub layer (28–59%, mean 42.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–22%, mean 5.5%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 30–65%, mean cover is 47.7%.

In this association, the shrub layer is characterized by *Malacothamnus fasciculatus* and *Malosma laurina. Salvia leucophylla* and *Artemisia californica* are usually included in this layer. Other shrubs sometimes include *Encelia californica, Baccharis pilularis, Salvia mellifera, Hazardia squarrosa,* and *Eriogonum cinereum*. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is simple and often includes *Leymus condensatus.* Other herbs may include *Bromus madritensis, Brassica nigra, Nassella lepida,* and *Marah macrocarpus.*

***Malacothamnus fasciculatus-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	21.2	7.5	35.0	X	X	
	MALA6	*Malosma laurina*	100	15.1	7.5	38.0	X	X	
	SALE3	*Salvia leucophylla*	52	1.3	0.2	8.0			
	ARCA11	*Artemisia californica*	48	1.0	0.2	5.0			
	ENCA	*Encelia californica*	43	0.7	0.2	7.0			
	BAPI	*Baccharis pilularis*	43	0.5	0.2	2.5			
	SAME3	*Salvia mellifera*	39	0.4	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	35	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	35	0.2	0.2	2.5			
	RHIN2	*Rhus integrifolia*	26	0.3	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	22	0.5	0.2	8.0			
	CESP	*Ceanothus spinosus*	22	0.4	1.0	3.0			
Herb									
	LECO12	*Leymus condensatus*	61	2.2	0.2	20.0	X		
	BRMA3	*Bromus madritensis*	35	0.4	0.2	6.0			X
	BRNI	*Brassica nigra*	30	0.3	0.2	2.5			X
	NALE2	*Nassella lepida*	26	0.8	0.2	15.0			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Brassica nigra, Centaurea melitensis, Bromus diandrus, Erodium cicutarium, Melilotus indicus, Hirschfeldia incana, Silybum marianum, Lactuca serriola, Anagallis arvensis, Avena barbata, Erodium, Malva parviflora, Marrubium vulgare, Melilotus

Samples Used in Description: (n = 23)
AA0268cc, AA0453cc, AA0464cc, AA0637, AA0886, AA0899, AA1065, rap0173, rap0518, rap0943m, rap1061, rap1084, rap1100, rap1148, rap1195, rap1215, rap1347, rap1348m, rap1349, rap1418, rap2266, rap2276, rap2317

Comments:
This association of the *M. fasciculatus* Alliance is usually found in lower elevation settings where prefire conditions were likely to support stands of *Artemisia californica, Salvia leucophylla,* or

Malosma laurina Alliance stands. The general vegetation environment of this association can be considered coastal sage scrub, rather than chaparral. Occasional *Ceanothus spinosus* within these stands suggests that at least some stands are mesic, but most are probably relatively dry sites within the zone of summer fog. See comments on the related *M. fasciculatus-Salvia leucophylla* Association for the similarities between these two associations.

Phases:
None

COMMON NAME	Bush Mallow-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (many plots but similar ecological setting to another closely related association of the same alliance)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus-Salvia leucophylla Shrubland Association

Bush Mallow-Purple Sage Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3281

Local Description

Summary:
This shrubland association occurs on moderate to steep northwest facing slopes at low elevations between 5–576 m. It is characterized by a dominance of *Malosma fasciculatum* and a subdominance of *Salvia leucophylla* in the shrub layer and *Leymus condensatus* in the herbaceous layer. The emergent tree layer infrequently includes *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 5–576 m, mean 337.7 m
Aspect: northwest
Slope: range 2–45 degrees, mean 26.2 degrees
Topography (micro; macro): flat, convex, or undulating; lower slope to ridgetop
Litter Cover: range 15–65%, mean 33.8%
Small Rock Cover: range 10–50%, mean 24%
Large Rock Cover: range 0–2%, mean 0.4%
Bare Ground: range 2–55%, mean 29%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Salvia leucophylla* Shrubland form an open to intermittent shrub layer (18–58%, mean 39.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–36%, mean 5.7%) at 0–2 m tall. Trees are occasionally emergent (0–5% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–60%, mean cover is 46%.

In this association, the shrub layer is characterized by *Malacothamnus fasciculatus, Salvia leucophylla,* and *Artemisia californica*. *Malosma laurina, Rhus ovata, Lotus scoparius,* and *Encelia californica* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus, Centaurea melitensis,* and *Bromus madritensis.*

***Malacothamnus fasciculatus-Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	20.1	8.0	38.0	X	X	
	SALE3	*Salvia leucophylla*	94	7.9	0.2	20.0		X	
	ARCA11	*Artemisia californica*	86	5.4	0.2	18.0		X	
	MALA6	*Malosma laurina*	54	1.1	0.2	6.0			
	RHOV	*Rhus ovata*	34	0.7	0.2	6.0			
	LOSC2	*Lotus scoparius*	29	0.8	0.2	9.0			
	ENCA	*Encelia californica*	29	0.8	0.2	10.0			
	HEAR5	*Heteromeles arbutifolia*	26	0.5	0.2	5.0			
	SAME3	*Salvia mellifera*	26	0.4	0.2	3.0			
	YUWH	*Yucca whipplei*	26	0.2	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	20	0.5	0.2	5.0			
Herb									
	LECO12	*Leymus condensatus*	43	1.9	0.2	15.0			
	BRNI	*Brassica nigra*	43	0.9	0.2	7.5			X
	CEME2	*Centaurea melitensis*	29	0.4	0.2	5.0			X
	BRMA3	*Bromus madritensis*	26	0.3	0.2	5.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 35 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 10 of 35 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Anagallis arvensis, Melilotus indicus, Avena barbata, Conium maculatum, Nicotiana glauca, Avena fatua, Bromus diandrus, Bromus hordeaceus, Cynodon dactylon, Erodium, Erodium cicutarium, Foeniculum vulgare, Phalaris aquatica

Samples Used in Description: (n = 35)
AA0082cc, AA0445cc, AA0461cc, AA0494cc, AA0495cc, AA0696, AA0848, AA0948, AA1030, rap0975, rap0999, rap1001m, rap1074m, rap1150, rap1345m, rap1396, rap1399, rap1400, rap1404, rap1531, rap1555, rap1579, rap1581, rap1678m, rap1726, rap1858, rap1922, rap1948m, rap1949, rap2027, rap2028, rap2483, rap2505, rap2572, rap2597

Comments:
This association of the *Malacothamnus fasciculatus* Alliance can be considered another seral stage in the general vegetation realm of the coastal sage scrub. In this association the major associate of the bush mallow is *Salvia leucophylla*. Although both *Malosma laurina* and *Artemisia californica* are present in more than half the stands, their cover is substantially lower than their average cover in the *M. fasciculatus-Malosma laurina* Association. Conversely, *Salvia leucophylla* is in higher cover than in that association. However, in many ways this association

and the previous *M. fasciculatus-Malosma laurina* Association are very similar and their distinction at the association level is somewhat questionable. There may be a rationale, with further analysis, to consider both as phases of a larger, more broadly encompassing association.

Phases:
None

COMMON NAME	Bush Mallow-Purple Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (many plots but similar ecological setting to another closely related association of the same alliance)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus-Salvia mellifera Shrubland Association

Bush Mallow-Black Sage Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3282

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 152–477 m. It is characterized by a codominance of *Malacothamnus fasciculatus* and *Salvia mellifera* in the shrub layer. The herbaceous layer is indistinct. The emergent tree layer includes occasional *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Dry Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 152–477 m, mean 318 m
Aspect: variable
Slope: range 2–35 degrees, mean 23.5 degrees
Topography (micro; macro): undulating or concave; bottom to upper slope
Litter Cover: range 30–45%, mean 33.8%
Small Rock Cover: range 5–45%, mean 20%
Large Rock Cover: range 0–5%, mean 1.7%
Bare Ground: range 15–50%, mean 33.3%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Salvia mellifera* Shrubland form an open to intermittent shrub layer (24–50%, mean 35.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–17%, mean 4.1%) at 0–1 m tall. Trees are occasionally emergent (0–7% cover, mean 1.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 27–55%, mean cover is 40.3%.

In this association, the shrub layer is characterized by *Salvia mellifera* and *Malacothamnus fasciculatus. Malosma laurina, Artemisia californica, Yucca whipplei,* and *Adenostoma fasciculatum* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis, Brassica nigra, Bromus madritensis,* and *Bromus diandrus.*

***Malacothamnus fasciculatus-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	12.7	2.0	28.0	X	X	
	SAME3	*Salvia mellifera*	100	10.9	6.0	16.0	X	X	
	MALA6	*Malosma laurina*	67	2.2	0.2	6.0			
	ARCA11	*Artemisia californica*	58	2.5	0.2	12.0			
	YUWH	*Yucca whipplei*	50	0.3	0.2	2.0			
	ADFA	*Adenostoma fasciculatum*	50	0.2	0.2	1.0			
	ENCA	*Encelia californica*	42	0.8	0.2	7.0			
	CEME	*Ceanothus megacarpus*	33	1.2	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	25	0.7	2.0	4.0			
	SAME5	*Sambucus mexicana*	25	0.1	0.2	1.0			
	HASQ2	*Hazardia squarrosa*	25	0.1	0.2	0.2			
	LOSC2	*Lotus scoparius*	25	0.1	0.2	0.2			
	RHOV	*Rhus ovata*	25	0.1	0.2	0.2			
	SALE3	*Salvia leucophylla*	25	0.1	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	42	0.6	0.2	3.0			X
	BRNI	*Brassica nigra*	42	0.5	0.2	5.0			X
	BRMA3	*Bromus madritensis*	42	0.4	0.2	2.0			X
	BRDI3	*Bromus diandrus*	33	0.4	1.0	2.0			X

Other Noteworthy Species:
Delphinium parryi was found in 1 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Bromus diandrus, Avena fatua, Marrubium vulgare, Anagallis arvensis, Erodium, Erodium cicutarium, Medicago polymorpha, Melilotus indicus

Samples Used in Description: (n = 12)
AA0562, rap0855, rap0945, rap1145, rap1264, rap1299, rap1337, rap1387m, rap1600, rap1798, rap1999, rap2902

Comments:
This association of the *Malacothamnus fasciculatus* Alliance bridges the gap between chaparral and coastal sage scrub based on the derivation of its prefire species pool. There is a fairly even mix of typical coastal sage species (*Encelia californica, Artemisia californica*) and chaparral species (*Adenostoma fasciculatum, Ceanothus megacarpus*) along with species such as *Salvia mellifera, Eriogonum fasciculatum,* and *Malosma laurina*, which may be found in either.

Phases:
None

COMMON NAME	Bush Mallow-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malosma laurina Shrubland Association

Laurel Sumac Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 7142

Local Description

Summary:
This shrubland association occurs on gentle to very steep southeast- to northwest-facing slopes at low elevations between 0–528 m. It is characterized by a dominance of *Malosma laurina* in the shrub layer and a relatively nondescript herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in about 20% of the stands.

Distribution:
This association is sampled in the Eastern Urban, Immediate Coast, Simi Hills Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–528 m, mean 235.7 m
Aspect: southeast to northwest
Slope: range 2–65 degrees, mean 23.4 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 25–85%, mean 57.5%
Small Rock Cover: range 0–50%, mean 16.4%
Large Rock Cover: range 0–60%, mean 4.5%
Bare Ground: range 0–60%, mean 19.8%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malosma laurina* Shrubland form an open to intermittent shrub layer (7–64%, mean 31.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–10 m tall. The herbaceous layer is open to intermittent (0–-45%, mean 10%) at 0–1 m tall. Trees are occasionally emergent (0–17% cover, mean 1.4%) with conifers at 0–10 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 21–68%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Malosma laurina. Artemisia californica, Eriogonum fasciculatum, Salvia mellifera, Heteromeles arbutifolia,* and *Ceanothus megacarpus* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Juglans californica, Platanus racemosa,* and *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus*, *Bromus diandrus, Centaurea melitensis,* and *Hirschfeldia incana*.

***Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	21	0.4	0.2	6.0			
Shrub									
	MALA6	*Malosma laurina*	100	23.0	5.0	49.0	X	X	
	ARCA11	*Artemisia californica*	49	0.6	0.2	7.0			
	ERFA2	*Eriogonum fasciculatum*	46	0.9	0.2	8.0			
	SAME3	*Salvia mellifera*	43	0.7	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	37	0.7	0.2	5.0			
	CEME	*Ceanothus megacarpus*	30	0.6	0.2	7.5			
	SAME5	*Sambucus mexicana*	29	0.6	0.2	9.0			
	MAFA	*Malacothamnus fasciculatus*	24	0.6	0.2	8.0			
	RHOV	*Rhus ovata*	22	0.4	0.2	6.0			
	BAPI	*Baccharis pilularis*	21	0.5	0.2	7.0			
	RHIN2	*Rhus integrifolia*	21	0.2	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	33	1.0	0.2	9.0			X
	LECO12	*Leymus condensatus*	27	0.2	0.2	7.5			
	BRDI3	*Bromus diandrus*	24	2.2	0.2	27.0			X
	CEME2	*Centaurea melitensis*	24	0.7	0.2	15.0			X
	HIIN3	*Hirschfeldia incana*	22	1.0	0.2	15.0			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 63 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 10 of 63 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Hirschfeldia incana, Nicotiana glauca, Pennisetum setaceum, Bromus madritensis, Marrubium vulgare, Avena, Ricinus communis, Eucalyptus, Bromus hordeaceus, Erodium, Myoporum laetum, Piptatherum miliaceum, Foeniculum vulgare, Euphorbia terracina, Avena fatua, Lactuca serriola, Conium maculatum, Erodium botrys, Avena barbata, Lobularia maritima, Romneya coulteri, Carpobrotus chilensis, Anagallis arvensis, Carduus pycnocephalus, Carpobrotus edulis, Chenopodium ambrosioides, Conyza canadensis, Cortaderia, Opuntia ficus-indica, Salsola tragus, Schinus molle

Samples Used in Description: (n = 63)
AA0075cc, AA0076cc, AA0174cc, AA0307cc, AA0342, AA0438, AA0440, AA0547, AA0560, AA0638, AA0690, AA0717, AA0726, AA0733, AA0787, AA0794, AA0796, AA0803, AA0806, AA0809, AA0881, AA0896, AA0970, AA0986, AA0990, AA0999, AA1000, AA1066, AA1121, AA1152, rap0045, rap0060, rap0167, rap0172, rap0241, rap0342, rap0514, rap0523, rap0758, rap0771, rap0811, rap0812, rap0814, rap0816, rap0818, rap0828, rap0834, rap0910, rap1042,

rap1043, rap1046, rap1098, rap1537, rap1568, rap1803m, rap1990, rap2099, rap2278, rap2320, rap2330, rap2562rlv, rap2604, rap2750

Comments:
The Santa Monica Mountains hold the dubious distinction of being the center for diversity of the *Malosma laurina* Alliance in the known world—dubious because of the apparent fact that *M. laurina* has increased its presence throughout its range in the historic past (Taylor 2004 and Stephen Davis personal communication 2003). The dominant species in this alliance resprouts prodigiously from the base following fire and with higher fire frequencies may tend to dominate stands that were once composed of a higher diversity of shrub species. This is the basic association of this locally diverse alliance where *M. laurina* is by far the most dominant species with little else to distinguish it. Two phases have been defined—a phase with a relatively dense overstory of *M. laurina* and a more open phase with scattered annual grasses and herbs in the understory.

Phases:
Malosma laurina (Laurel Sumac) Phase [7142]
Malosma laurina/Annual Grass-Herb (Laurel Sumac/Annual Grass-Herb) Phase [2145]

COMMON NAME	Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is known from San Diego County and from western Riverside County as well (Evens and San 2005 and Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Evens and San 2005, Klein and Evens 2005, Taylor 2004

Malosma laurina-Artemisia californica Shrubland Association

Laurel Sumac-California Sagebrush Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 7148

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and northwest-facing slopes at low elevations between 2–611 m. It is characterized by a dominance of *Malosma laurina* and a subdominance of *Artemisia californica;* in many cases, *Salvia leucophylla* in the shrub layer; and typically a minor presence of the grass *Leymus condensatus* in the herbaceous layer. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Dry Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 2–611 m, mean 227.6 m
Aspect: northeast and northwest
Slope: range 2–40 degrees, mean 25.4 degrees
Topography (micro; macro): undulating, convex, or flat; lower to upper slope
Litter Cover: range 50–50%, mean 50%
Small Rock Cover: range 0–35%, mean 10.1%
Large Rock Cover: range 0–4%, mean 0.5%
Bare Ground: range 5–55%, mean 27.1%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Malosma laurina-Artemisia californica* Shrubland form an open to intermittent shrub layer (10–63%, mean 40.2%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–36%, mean 5.9%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 0.8%) with hardwoods at 0–10 m tall. Total vegetation cover is 26–65%, mean cover is 46.8%.

In this association, the shrub layer is characterized by *Malosma laurina* and *Artemisia californica*. *Salvia leucophylla* is often present. *Malacothamnus fasciculatus, Eriogonum cinereum, Mimulus aurantiacus, Salvia mellifera, Baccharis pilularis,* and *Sambucus mexicana* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and often includes *Leymus condensatus.* Other herbs may include *Nassella lepida, Centaurea melitensis, Brassica nigra,* and *Marah macrocarpus.*

***Malosma laurina-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	20.2	8.0	46.0	X		
	ARCA11	*Artemisia californica*	100	7.4	0.2	15.0	X		
	SALE3	*Salvia leucophylla*	73	7.1	0.2	20.0			
	MAFA	*Malacothamnus fasciculatus*	44	0.9	0.2	12.0			
	ERCI5	*Eriogonum cinereum*	35	0.6	0.2	7.5			
	MIAU	*Mimulus aurantiacus*	33	0.9	0.2	7.0			
	SAME3	*Salvia mellifera*	27	0.8	0.2	6.0			
	BAPI	*Baccharis pilularis*	25	0.6	0.2	10.0			
	SAME5	*Sambucus mexicana*	25	0.2	0.2	2.0			
	HEAR5	*Heteromeles arbutifolia*	23	0.7	0.2	12.0			
Herb									
	LECO12	*Leymus condensatus*	56	1.9	0.2	17.0			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 9 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Bromus madritensis, Phalaris aquatica, Euphorbia terracina, Nicotiana glauca, Bromus hordeaceus, Erodium, Acacia redolens, Melilotus indicus, Myoporum laetum, Senecio mikanioides, Anagallis arvensis, Avena barbata, Avena fatua, Bromus diandrus, Erodium cicutarium, Eucalyptus, Foeniculum vulgare, Marrubium vulgare

Samples Used in Description: (n = 48)
AA0273cc, AA0437, AA0570, AA0700, AA0722, AA0763, AA0767, AA0793, AA0797, AA0800, AA0849, AA0882, AA0935, AA1004, AA1150, AA1151, rap0025m, rap0059, rap0067, rap0074, rap0088, rap0214, rap0656m, rap0683, rap0685, rap0989, rap0995m, rap0997, rap1007, rap1066, rap1089m, rap1091, rap1194, rap1245m, rap1416, rap1417, rap1453, rap1503, rap1538, rap1617, rap1766m, rap2037, rap2069, rap2302, rap2477, rap2732, rap2741, rap2763

Comments:
This association of the *Malosma laurina* Alliance is distinguished by the subdominance of the coastal sage scrub species, especially *Artemisia californica* and often *S. leucophylla*. The current model of how this association has arisen as a common type is that higher than historic fire frequencies and perhaps other disturbance, such as brush clearing, has afforded the resprouter

Malosma laurina the opportunity to dominate over what otherwise may have previously been stands historically dominated by *Artemisia californica* and/or *Salvia leucophylla*. Two phases of this association have been identified based on either the singular presence of *Artemisia californica* or a mixture of it and *Salvia leucophylla* associated with the dominant species.

Phases:
Malosma laurina-Artemisia californica (Laurel Sumac-California Sagebrush) Phase [7148]
Malosma laurina-Artemisia californica-Salvia leucophylla (Laurel Sumac-California Sagebrush-Purple Sage) Phase [2142]

COMMON NAME	Laurel Sumac-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is likely present in low elevation slopes of southern California from the peninsular to transverse ranges from San Diego County north to Ventura County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is similarly described in western Riverside and San Diego counties. However, it is within the *Artemisia californica* Alliance as the *Artemisia californica-Malosma laurina* Association where *Malosma laurina* is consistently present as a codominant or subdominant shrub. Shrubs *Salvia apiana, Mimulus aurantiacus,* and *Eriogonum fasciculatum* are often present at low cover.

References:
Evens and San 2005, Klein and Evens 2005

Malosma laurina-Eriogonum cinereum Shrubland Association

Laurel Sumac-Ashy Buckwheat Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 2141

Local Description

Summary:
This shrubland association occurs on gentle to abrupt southwest- and southeast-facing slopes at low elevations between 0–550 m. It is characterized by a dominance of *Malosma laurina* and a subdominance of *Eriogonum cinereum* in the shrub layer. The herbaceous layer is relatively insignificant with no apparent indicator species. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Upper Elevation Santa Monica Mountains, Eastern Urban, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–550 m, mean 153.3 m
Aspect: southwest and southeast
Slope: range 2–70 degrees, mean 31.7 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 8–75%, mean 32.6%
Small Rock Cover: range 0–60%, mean 26%
Large Rock Cover: range 0–70%, mean 6.7%
Bare Ground: range 0–75%, mean 24.7%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malosma laurina-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (10–52%, mean 33.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–34%, mean 4.1%) at 0–2 m tall. Trees are occasionally emergent (0–5% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 10–58%, mean cover is 37.9%.

In this association, the shrub layer is characterized by *Malosma laurina, Eriogonum cinereum,* and *Salvia mellifera. Artemisia californica, Yucca whipplei,* and *Encelia californica* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Leymus condensatus, Brassica nigra, Bromus madritensis,* and *Nassella lepida.*

***Malosma laurina-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	12.4	2.0	31.0		X	
	ERCI5	*Eriogonum cinereum*	96	6.2	0.2	19.0		X	
	SAME3	*Salvia mellifera*	76	4.4	0.2	15.0		X	
	ARCA11	*Artemisia californica*	73	2.3	0.2	15.0			
	YUWH	*Yucca whipplei*	70	1.2	0.2	7.5			
	ENCA	*Encelia californica*	53	1.6	0.2	15.0			
	RHIN2	*Rhus integrifolia*	40	1.5	0.2	13.0			
	HEAR5	*Heteromeles arbutifolia*	38	0.5	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	33	1.0	0.2	10.0			
	LOSC2	*Lotus scoparius*	32	0.7	0.2	12.0			
	RHOV	*Rhus ovata*	26	0.5	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.4	0.2	11.0			
	CEME	*Ceanothus megacarpus*	22	0.5	0.2	7.5			
Herb									
	LECO12	*Leymus condensatus*	34	0.8	0.2	9.0			
	BRNI	*Brassica nigra*	20	0.2	0.2	5.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 98 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 98 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Pennisetum setaceum, Centaurea melitensis, Avena, Bromus diandrus, Erodium, Nicotiana glauca, Hirschfeldia incana, Foeniculum vulgare, Avena fatua, Avena barbata, Euphorbia terracina, Piptatherum miliaceum, Salsola tragus, Cortaderia, Erodium cicutarium, Melilotus indicus, Anagallis arvensis, Arundo donax, Brassica, Bromus hordeaceus, Malva parviflora, Marrubium vulgare, Melilotus, Oxalis pes-caprae, Ricinus communis, Senecio vulgaris, Sisymbrium, Sonchus asper

Samples Used in Description: (n = 98)
AA0012cc, AA0013cc, AA0045cc, AA0072cc, AA0081cc, AA0117cc, AA0119cc, AA0120cc, AA0175cc, AA0177cc, AA0206cc, AA0212cc, AA0277cc, AA0278cc, AA0358cc, AA0371cc, AA0374cc, AA0376cc, AA0383, AA0387cc, AA0405, AA0450cc, AA0451cc, AA0452cc, AA0480cc, AA0493cc, AA0511, AA0633, AA0634, AA0656, AA0701, AA0718, AA0875, AA0884, AA0892, AA0898, AA0923, AA1023, AA1026, AA1027, AA1032, AA1048, AA1051, AA1157, rap0033m, rap0112, rap0169, rap0178, rap0185, rap0207, rap0209, rap0385, rap0425m, rap0517, rap0687, rap0738, rap0852, rap0885, rap0963, rap0964, rap0966m, rap0968m, rap0993, rap1003, rap1018, rap1019, rap1020, rap1049, rap1067, rap1069, rap1070, rap1075, rap1081m, rap1090, rap1123, rap1162, rap1189, rap1214m, rap1303, rap1306m, rap1340,

rap1362, rap1363, rap1364, rap1366, rap1377, rap1408m, rap1736, rap2166, rap2541rlv, rap2542rlv, rap2552, rap2561rlv, rap2618, rap2716, rap2784, rap2819, rap2908rlv

Comments:
This is a common and likely largely endemic association to the study area. It is common on steep southerly facing slopes, mostly close to the coast. The variety of associated species can be seen by scanning the list of minor phases that have been identified in the area. In general, variation is increased by seral stage (mostly time since fire influencing the presence of such species as *Lotus scoparius* and *Malacothamnus fasciculatus*) and local site conditions (slightly hotter and better drained slopes may have more *Salvia mellifera* while more coastal foggy slopes may have more *Rhus integrifolia* and *Artemisia californica*). However, the degree of overlap between these phases in species cover and composition was too great to warrant further separation into distinct associations.

Phases:
Malosma laurina-Eriogonum cinereum (Laurel Sumac-Ashy Buckwheat) Phase [2141]
Malosma laurina-Rhus integrifolia-Eriogonum cinereum-Artemisia californica (Laurel Sumac-Lemonade Berry-Ashy Buckwheat-California Sagebrush) Phase [21413]
Malosma laurina-Malacothamnus fasciculatus-Eriogonum cinereum-Salvia mellifera (Laurel Sumac-Bush Mallow-Ashy Buckwheat-Black Sage) Phase [7146]
Malosma laurina-Eriogonum cinereum-Lotus scoparius (Laurel Sumac-Ashy Buckwheat-Deerweed) Phase [7144]
Malosma laurina-Eriogonum cinereum-Salvia mellifera (Laurel Sumac-Ashy Buckwheat-Black Sage) Phase [7141]

COMMON NAME	Laurel Sumac-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malosma laurina-Eriogonum fasciculatum Shrubland Association

Laurel Sumac-California Buckwheat Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 21423

Local Description

Summary:
This shrubland association occurs on somewhat steep to abrupt southwest- and southeast-facing slopes at low elevations between 0–602 m. It is characterized by a codominance of *Malosma laurina* and *Eriogonum fasciculatum* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 0–602, mean 413.7 m
Aspect: southwest and southeast
Slope: range 15–75 degrees, mean 35.1 degrees
Topography (micro; macro): variable (all); middle to upper slope
Litter Cover: range 2–35%, mean 16.8%
Small Rock Cover: range 2–65%, mean 29.7%
Large Rock Cover: range 0–85%, mean 7.6%
Bare Ground: range 2–45%, mean 21.2%
Parent Material: metamorphic, sedimentary, or igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Malosma laurina-Eriogonum fasciculatum* Shrubland form an open to intermittent shrub layer (4–54%, mean 31.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–16%, mean 3.4%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 4–55%, mean cover is 34.4%.

In this association, the shrub layer is characterized by *Eriogonum fasciculatum* and *Malosma laurina. Ceanothus megacarpus, Salvia mellifera, Heteromeles arbutifolia, Rhus ovata,* and *Adenostoma fasciculatum* are frequently included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Brassica nigra, Melica imperfecta, Centaurea melitensis, Gnaphalium* sp., and *Bromus diandrus.*

***Malosma laurina-Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	100	12.3	3.0	28.0	X		
	MALA6	*Malosma laurina*	100	9.6	0.2	20.0	X		
	CEME	*Ceanothus megacarpus*	64	1.5	0.2	7.5			
	SAME3	*Salvia mellifera*	57	0.9	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	55	1.6	0.2	7.5			
	RHOV	*Rhus ovata*	53	0.9	0.2	7.5			
	ADFA	*Adenostoma fasciculatum*	50	0.7	0.2	5.0			
	YUWH	*Yucca whipplei*	48	0.2	0.2	2.5			
	ARCA11	*Artemisia californica*	28	0.5	0.2	8.0			
	CESP	*Ceanothus spinosus*	26	0.3	0.2	4.0			
Herb									
	BROMU	*Bromus*	26	1.0	0.2	15.0			

Other Noteworthy Species:
Eriogonum crocatum was found in 1 of 58 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 1 of 58 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Avena, Bromus diandrus, Bromus madritensis, Avena barbata, Hirschfeldia incana, Nicotiana glauca, Brassica, Pennisetum setaceum, Acacia redolens, Avena fatua, Eucalyptus, Marrubium vulgare, Piptatherum miliaceum, Ricinus communis

Samples Used in Description: (n = 58)
AA0057cc, AA0095cc, AA0127cc, AA0167cc, AA0248cc, AA0249cc, AA0343, AA0347, AA0548, AA0584, AA0665, AA0703, AA0773, AA0833, AA0835, AA0840, AA0940, AA0985, AA1169, AA1170, AA1217, rap0162m, rap0234m, rap0238, rap0240m, rap0301, rap0311, rap0314, rap0319, rap0320, rap0322m, rap0323, rap0326, rap0327, rap0362, rap0381, rap0393, rap0394, rap0396, rap0430, rap0431, rap0451, rap0452m, rap0453, rap0479, rap0769, rap0770, rap0857, rap1143, rap1159, rap1183, rap1186, rap1630m, rap1763, rap2170, rap2293, rap2480, rap2674

Comments:
This association occurs fairly commonly on hot, dry southerly facing slopes. It is widespread throughout the study area in most of the subregions. It is perhaps most common in the upper elevation regions of the mountains where it tends to be restricted to very steep south-facing slopes.

Phases:
Malosma laurina-Eriogonum fasciculatum (Laurel Sumac-California Buckwheat) Phase [21423]
Malosma laurina-Eriogonum fasciculatum-Artemisia californica/Annual Grass-Herb (Laurel Sumac-California Buckwheat-California Sagebrush/Annual Grass-Herb) Phase [3382]

Malosma laurina-Eriogonum fasciculatum-Heteromeles arbutifolia-Ceanothus megacarpus (Laurel Sumac-California Buckwheat-Toyon-Big Pod Ceanothus) Phase [3383]

COMMON NAME	Laurel Sumac-California Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and from San Diego (Evens and San 2005) and western Riverside counties (Klein and Evens 2005). Information about its global distribution is not available without additional inventory, although it is likely to occur elsewhere in southern California below about 1,000 m.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
In the *Malosma laurina-Eriogonum fasciculatum* Association, both species are codominant in the shrub overstory. *Salvia apiana*, *Ceanothus leucodermis*, *Heteromeles arbutifolia*, *Baccharis pilularis*, and *Baccharis salicifolia* are examples of species that may occur as shrubs at low cover. The understory herbaceous layer is variable and usually dominated by nonnative species such as *Bromus madritensis, Avena fatua, Centaurea melitensis,* and *Hirschfeldia incana.*

Comments:
This association appears to have fairly constant environmental and species characteristics in all places it has been sampled in southern California.

References:
Evens and San 2005, Klein and Evens 2005

Malosma laurina-Rhus ovata-Ceanothus megacarpus Shrubland Association

Laurel Sumac-Sugar Bush-Big Pod Ceanothus Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 21415

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep, usually south-facing slopes at low elevations between 156–694 m. It is dominated by *Malosma laurina,* and *Rhus ovata* and *Ceanothus megacarpus* are subdominant or sometimes codominant with *Malosma*. The herbaceous layer is relatively simple and infrequent with species such as *Brassica nigra*, *Bromus, Marah macrocarpus,* and/or *Melica imperfecta.* The tree layer is also sometimes present and includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 156–694 m, mean 306 m
Aspect: most often southwest and southeast, sometimes variable, and rarely northwest
Slope: range 15–38 degrees, mean 33.0 degrees
Topography (micro; macro): often undulating or flat, sometimes convex or concave; lower to upper slopes, rarely bottom or ridgetop
Litter Cover: 55% (one sample)
Small Rock Cover: range 5–30%, mean 17.5%
Large Rock Cover: range 0–5%, mean 2.0%
Bare Ground: range 15–32%, mean 23.7%
Parent Material: frequently igneous and sedimentary, sometimes depositional or metamorphic
Soil Texture: moderately fine sandy clay loam (one sample)

Vegetation Description:
Stands of *Malosma laurina-Rhus ovata-Ceanothus megacarpus* Shrubland form an open to intermittent shrub layer (12–51%, mean 38.4%). Shrubs commonly occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–35%, mean 3.4%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.2%) hardwoods at 0–10 m tall. Total vegetation cover is 30–53%, mean cover is 41.6%.

In this association, the shrub layer is dominated openly to intermittently by *Malosma laurina,* and *Rhus ovata* and *Ceanothus megacarpus* are subdominant or sometimes codominant with *Malosma*. Other species characteristically present but at low cover are *Salvia mellifera* and *Adenostoma fasciculatum*, while a variety of other chaparral or coastal sage scrub species may also be present at low cover such as *Eriogonum fasciculatum* and *Heteromeles arbutifolia*. The herbaceous layer is relatively simple and infrequent with species such as *Brassica nigra*, *Bromus, Marah macrocarpus,* and/or *Melica imperfecta.* Occasionally, emergent trees may occur including *Quercus agrifolia*.

***Malosma laurina-Rhus ovata-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	0.2	0.2	1.0			
Shrub									
	MALA6	*Malosma laurina*	100	15.3	3.0	31.0	X	X	
	RHOV	*Rhus ovata*	94	9.6	1.0	24.0		X	
	CEME	*Ceanothus megacarpus*	88	4.7	0.2	14.0		X	
	SAME3	*Salvia mellifera*	88	2.0	0.2	7.5		X	
	ADFA	*Adenostoma fasciculatum*	75	2.1	0.2	6.0		X	
	ERFA2	*Eriogonum fasciculatum*	56	0.9	0.2	4.0			
	HEAR5	*Heteromeles arbutifolia*	50	0.9	0.2	4.0			
	ARCA11	*Artemisia californica*	31	0.3	0.2	2.0			
	NIGL	*Nicotiana glauca*	31	0.2	0.2	1.0			X
	BRCA3	*Brickellia californica*	31	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	25	0.8	0.2	11.0			
	CESP	*Ceanothus spinosus*	25	0.8	2.0	5.0			
	CEBE3	*Cercocarpus betuloides*	25	0.2	0.2	1.0			
Herb									
	BRNI	*Brassica nigra*	25	0.2	0.2	2.5			X

Other Noteworthy Species:
Juglans californica was found in 1 of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Nicotiana glauca, Brassica nigra, Bromus diandrus, Centaurea benedictus, Pennisetum setaceum, Senecio mikanioides

Samples Used in Description: (n = 16)
AA0159cc, AA0412, AA0589, AA0591, AA0640, AA0916, rap0374, rap0713, rap0735, rap0740, rap0831, rap0863, rap1172, rap1878m, rap2332, rap2721

Comments:
None

Phases:
None

COMMON NAME	Laurel Sumac-Sugar Bush-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Malosma laurina-Salvia mellifera Shrubland Association

Laurel Sumac-Black Sage Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 2148

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 17–756 m. It is characterized by a codominance of *Malosma laurina* and *Salvia mellifera* in the shrub layer. The herbaceous layer is generally insignificant. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 17–756 m, mean 321.4 m
Aspect: southeast and southwest
Slope: range 15–40 degrees, mean 32 degrees
Topography (micro; macro): variable (all); lower slope to ridgetop
Litter Cover: range 15–35%, mean 25%
Small Rock Cover: range 0–50%, mean 23.7%
Large Rock Cover: range 0–5%, mean 1.3%
Bare Ground: range 14–65%, mean 37.7%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malosma laurina-Salvia mellifera* Shrubland form an open to intermittent shrub layer (15–60%, mean 36.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–18%, mean 3.8%) at 0–1 m tall. Trees are frequently emergent (0–10% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 16–62%, mean cover is 40.8%.

In this association, the shrub layer is characterized by *Malosma laurina* and *Salvia mellifera*. *Eriogonum fasciculatum, Heteromeles arbutifolia,* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Brassica nigra, Centaurea melitensis, Bromus madritensis, Marah macrocarpus,* and *Bromus diandrus.*

***Malosma laurina-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	14.9	4.0	35.0		X	
	SAME3	*Salvia mellifera*	96	11.6	0.2	25.0		X	
	ERFA2	*Eriogonum fasciculatum*	67	2.1	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	58	1.0	0.2	8.0			
	ADFA	*Adenostoma fasciculatum*	51	1.5	0.2	8.0			
	RHOV	*Rhus ovata*	48	1.0	0.2	9.0			
	YUWH	*Yucca whipplei*	48	0.5	0.2	2.5			
	ARCA11	*Artemisia californica*	41	0.5	0.2	3.0			
	ENCA	*Encelia californica*	36	0.7	0.2	5.0			
	CEME	*Ceanothus megacarpus*	33	0.6	0.2	5.0			
	MAFA	*Malacothamnus fasciculatus*	28	0.6	0.2	10.0			
	LOSC2	*Lotus scoparius*	28	0.4	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	22	0.5	0.2	6.0			
Herb									
	BRNI	*Brassica nigra*	33	0.5	0.2	6.0			X
	CEME2	*Centaurea melitensis*	23	0.5	0.2	8.0			X

Other Noteworthy Species:
Juglans californica was found in 5 of 69 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 69 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Avena, Bromus diandrus, Hirschfeldia incana, Pennisetum setaceum, Erodium, Nicotiana glauca, Marrubium vulgare, Euphorbia terracina, Avena fatua, Melilotus indicus, Bromus hordeaceus, Avena barbata, Erodium cicutarium, Eucalyptus, Foeniculum vulgare, Lobularia maritima, Raphanus sativus, Ricinus communis, Schinus molle, Silene gallica, Vinca major

Samples Used in Description: (n = 69)
AA0008cc, AA0022cc, AA0028cc, AA0035cc, AA0036cc, AA0069cc, AA0139cc, AA0147cc, AA0182cc, AA0207cc, AA0244cc, AA0271cc, AA0272cc, AA0305cc, AA0379cc, AA0403, AA0427, AA0454cc, AA0593, AA0723, AA0752, AA0790, AA0818, AA0839, AA0964, AA0980, AA0984, AA0993, AA1084, AA1117, AA1145, AA1149, AA1153, AA1160, rap0344, rap0349, rap0352, rap0564, rap0673, rap0800, rap0815, rap0840m, rap0887, rap0889, rap0912, rap0913, rap1035, rap1051, rap1056, rap1118, rap1126m, rap1164, rap1165, rap1178m, rap1233, rap1281m, rap1358, rap1372, rap1523, rap1627, rap1634, rap1705, rap1989, rap2169, rap2191, rap2216, rap2391, rap2799, rap2845

Comments:
This is a common association and appears to be widespread throughout much of the study area on dry, hot exposures.

Phases:
None

COMMON NAME	Laurel Sumac-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	61Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. It is also likely throughout south coastal California evidenced by the similar descriptions of types in Riverside and San Diego counties (Evens and San 2005, Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
In the *Malosma laurina-Eriogonum fasciculatum-Salvia mellifera* Association described from western Riverside County by Klein and Evens (2005) and from San Diego County by Evens and San (2005), all three shrubs are usually codominant. Other chaparral and coastal sage species that are characteristically present at low cover include *Heteromeles arbutifolia*, *Artemisia californica*, *Adenostoma fasciculatum*, and *Yucca whipplei*. The herbaceous layer, which includes a variety of native and nonnative species, is usually dominated by *Bromus madritensis*.

Comments:
We suggest merging this association with the *Malosma laurina-Eriogonum fasciculatum-Salvia mellifera* Association of Klein and Evens (2005) and Evens and San (2005). The frequency of *Eriogonum fasciculatum* in the SAMO samples is 67%, high enough to be considered an adequate constancy by most standards.

References:
Evens and San 2005, Klein and Evens 2005

Mesembryanthemum spp.-*Carpobrotus* spp. Seminatural Shrubland Alliance

Ice Plant Shrubland Alliance

Mapping Code: 4720

Local Description

Summary:
This shrubland alliance occurs on abrupt to steep slopes with northeast aspect at low elevations between 2–46 m. It is dominated by the sprawling *Carpobrotus edulis* in the low shrub layer. The emergent tree layer includes occasional nonnative species such as *Schinus molle* and *Pinus* sp.

Distribution:
This alliance is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 2–46 m, mean 17.6 m
Aspect: northeast
Slope: range 2–85 degrees, mean 28.5 degrees
Topography (micro; macro): flat or undulating; slope bottom to upper slope
Litter Cover: range 15–65%, mean 40%
Small Rock Cover: range 2–20%, mean 9.8%
Large Rock Cover: range 0–50%, mean 12.5%
Bare Ground: range 12–80%, mean 44.3%
Parent Material: quaternary or sedimentary
Soil Texture: sand to very fine loamy sand

Vegetation Description:
Stands of this shrubland alliance form an open shrub layer (7–20%, mean 12%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–2 m tall. The herbaceous layer is open to intermittent (13–40%, mean 26.2%) at 0.1–0.5 m tall. Trees are very occasionally emergent (0–0.4% cover, mean 0.66%) with conifers at 1–10 m and hardwoods at 0–5 m tall. Total vegetation cover is 23–51%, mean cover is 38.2%.

In this association, the shrub layer often includes *Artemisia californica* and *Encelia californica. Rhus integrifolia, Isocoma menziesii,* and *Coreopsis gigantea* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Schinus molle* and *Pinus* sp. at very low cover. The herbaceous layer is diverse and is characterized by *Carpobrotus edulis.* Other herbs sometimes include *Ambrosia chamissonis, Marah macrocarpus, Leymus condensatus, Brassica nigra,* and *Distichlis spicata. Mesembryanthemum crystallinum* is occasionally present.

***Mesembryanthemum* spp.-*Carpobrotus* spp. Seminatural Herbaceous Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	67	1.9	0.2	6.0			
	ENCA	*Encelia californica*	67	1.7	0.2	6.0			
	RHIN2	*Rhus integrifolia*	50	1.2	0.2	7.0			
	ISME5	*Isocoma menziesii*	50	0.7	0.2	3.0			
	COGI	*Coreopsis gigantea*	50	0.4	0.2	1.0			
	ERER11	*Ericameria ericoides*	33	1.7	2.0	8.0			
	LOSC2	*Lotus scoparius*	33	0.7	1.0	3.0			
	BAPI	*Baccharis pilularis*	33	0.5	0.2	3.0			
	OPLI3	*Opuntia littoralis*	33	0.5	0.2	3.0			
	MYLA5	*Myoporum laetum*	33	0.3	1.0	1.0			X
	MALA6	*Malosma laurina*	33	0.2	0.2	1.0			
	MILA6	*Mirabilis laevis*	33	0.1	0.2	0.2			
	NIGL	*Nicotiana glauca*	33	0.1	0.2	0.2			X
Herb									
	CAED3	*Carpobrotus edulis*	100	22.0	10.0	40.0	X	X	X
	AMCH4	*Ambrosia chamissonis*	33	0.4	0.2	2.0			
	BRNI	*Brassica nigra*	33	0.3	1.0	1.0			X
	DISP	*Distichlis spicata*	33	0.2	0.2	1.0			
	LECO12	*Leymus condensatus*	33	0.2	0.2	1.0			
	MAMA8	*Marah macrocarpus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Abronia umbellata was found in 1 of 6 surveys of this plant community, which is *Abronia umbellata* spp. *umbellata.* Regionally, the park considers this species as Rare (SAMO 2004). There is no state or global rank of this subspecies (CNPS 2005).

Nonnative Species:
Carpobrotus edulis, Brassica nigra, Myoporum laetum, Nicotiana glauca, Melilotus indicus, Ricinus communis, Bromus madritensis, Conyza canadensis, Anagallis arvensis, Atriplex semibaccata, Bromus diandrus, Bromus hordeaceus, Cakile maritima, Carpobrotus chilensis, Erodium, Foeniculum vulgare, Lamarckia aurea, Melilotus, Mesembryanthemum crystallinum, Nerium oleander, Pennisetum setaceum, Rumex crispus, Salsola tragus, Schinus molle, Sonchus

Samples Used in Description: (n = 6)
AA0672, rap0640, rap0648, rap1028, rap2777, rap2890rlv

Comments:
This is a widespread introduced vegetation type along the coast of California. It may be composed of one or more species of *Mesembryanthemum* or *Carpobrotus.* The most widespread species in the SAMO study area is *Carpobrotus edulis.* This is an invasive species that sprawls over dunes and coastal bluffs, smothering and shading out native species such as *Coreopsis gigantea, Ericameria ericoides, Ambrosia chamissonis*, and other native herbaceous species.

Phases:
None

COMMON NAME	Ice Plant Herbaceous Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural temperate or subpolar perennial forb vegetation
FORMATION	V.B.2.N.b. Low temperate or subpolar perennial forb vegetation
ALLIANCE	*Mesembryanthemum* spp.-*Carpobrotus* spp. *Seminatural Herbaceous Alliance* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—This is an introduced alliance that usually strongly dominates the landscape to the exclusion of other native species.

Global Description

Distribution:
Ice plant mats occur along the northern, central, and southern California coasts, the Central Valley, and on the Channel Islands.

Nations:
United States

States or Provinces:
CA
Northern California coast (263A)—*Carpobrotus edulis* is the most common invader of dune habitats and is widespread on most dune systems.
Central California coast (261B)—*Mesembryanthemum* sp. and *Carpobrotus edulis* are both common on dune systems.
Southern California coast (261B)—*Mesembryanthemum* sp. and *Carpobrotus edulis* are both common on dune systems. On the Channel Islands, *Mesembryanthemum* sp. crowded out many native herbaceous and subshrub stands especially on the northern Channel Islands. Salt buildup from the leaves has effectively changed the soil chemistry of some of these stands and effectively excludes native species from recolonizing (Vivrette and Muller 1977).
Great Valley (262A)—Stands occur in Suisun marsh and in other delta areas of the Sacramento-San Joaquin delta (Keeler-Wolf et al. 2000).

Environmental Description:
Occurs on bluffs and disturbed land and sand dunes of the immediate coastline from sea level to 100 m elevation.

Vegetation Description:
Carpobrotus, *Mesembryanthemum* sp., or *Malephora crocea* is the sole or dominant herb in the ground canopy; *Abronia latifolia, Ambrosia chamissonis, Eriogonum latifolium, and/or Poa douglasii* may be present. Emergent shrubs may be present. Herbs are less than 50 cm; canopy is continuous.

Comments:
This treatment is broadly defined to recognize the importance of these introduced species in California's vegetation. The invasive character of several taxa in the *Aizoaceae* family is well appreciated in California, especially on coastal dune habitats. Three genera are included in this series. The *Jepson Manual* includes five taxa in the genera *Carpobrotus*, *Malephora*, and *Mesembryanthemum* as having naturalized in the state. These taxa have historically been placed in *Mesembryanthemum* but are now referred to as *Carpobrotus chilensis, C. edulis, Malephora crocea, Mesembryanthemum crystallinum, and M. nodiflorum.* All are invasive and replace native dune species, particularly members of the *Ambrosia chamissonis* and *Lupinus chamissonis-Ericameria ericoides* alliances.

Widely planted as a soil binder on embankments and as ornamental in coastal districts (Prescott and Venning 1984), ice plants (especially *Carpobrotus edulis*) can form impenetrable mats that crowd out other species. For years, local southern California fire departments have recommended ice plant to people with houses in fire-prone areas. Ice plant is also often used to control erosion. However, during years with a lot of rain, the succulent ice plant swells with water and can cause entire slopes to slide from the increased weight. *Carpobrotus edulis* is considered one of the most invasive wildland plants in California by the California Exotic Plants Pest Council (CalEPPC List of Exotic Pest Plants of Greatest Ecological Concern 2002 http://www.caleppc.org/info/99lista.html). Ice plant stands are being removed to restore native vegetation on the coastal dunes and enhance populations of rare species (Pickart and Sawyer 1998). Removal of these species is time consuming by hand-pulling (large mats can be removed by rolling them up like a carpet) and yet is easier and more cost-effective than removal of *Ammophila arenaria* (Albert 1996). Many California state park and national park lands along the coast are actively removing ice plant and replacing it with native dune species such as members of the *Ambrosia chamissonis* and *Lupinus chamissonis-Ericameria ericoides* alliances.

References:
Albert 1996, Hickman 1993, Keeler-Wolf and Vaghti 2000, Pickart and Sawyer 1998, Prescott and Venning 1984, Sawyer and Keeler-Wolf 1995, Vivrette and Muller 1977

Mimulus aurantiacus Shrubland Association

Bush Monkey Flower Shrubland Association
***Mimulus aurantiacus* Shrubland Alliance**
Bush Monkey Flower Shrubland Alliance

Mapping Code: 2172

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast and northwest slopes at low elevations between 43–571 m. It is characterized by a strong dominance of *Mimulus aurantiacus* in the shrub layer. It has a presence of *Leymus condensatus* in most stands in the herbaceous layer, though this species is not considered characteristic. The emergent tree layer is usually absent but may include *Juglans californica, Eucalyptus* sp., *Pinus* sp., *Quercus agrifolia,* and *Platanus racemosa*.

Distribution:
This association is sampled in the Western Fog Zone, Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 43–571 m, mean 297 m
Aspect: northeast and northwest
Slope: range 15–40 degrees, mean 31.1 degrees
Topography (micro; macro): variable (all); lower slope to ridgetop
Litter Cover: range 5–75%, mean 38.8%
Small Rock Cover: range 2–25%, mean 14.3%
Large Rock Cover: range 0–8%, mean 1.7%
Bare Ground: range 10–35%, mean 21.7%
Parent Material: igneous or sedimentary
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Mimulus aurantiacus* Shrubland form an open to intermittent shrub layer (13–63%, mean 43.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–22%, mean 3.6%) at 0–1 m tall. Trees are occasionally emergent (0–6% cover, mean 1.3%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 32–70%, mean cover is 48.1%.

In this association, the shrub layer is characterized by *Mimulus aurantiacus, Artemisia californica,* and *Malosma laurina. Salvia leucophylla, Toxicodendron diversilobum,* and *Sambucus mexicana* are usually included in this layer. The tree layer is emergent and open and may include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and often includes *Leymus condensatus.* Other herbs may include *Melica imperfecta, Centaurea melitensis, Hirschfeldia incana,* and *Bromus madritensis.*

***Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MIAU	*Mimulus aurantiacus*	100	22.4	7.0	46.0	X		
	ARCA11	*Artemisia californica*	87	1.8	0.2	8.0	X		
	MALA6	*Malosma laurina*	78	4.4	0.2	15.0	X		
	SALE3	*Salvia leucophylla*	65	3.0	0.2	18.0			
	TODI	*Toxicodendron diversilobum*	52	1.1	0.2	10.0			
	SAME5	*Sambucus mexicana*	52	0.6	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	43	1.3	0.2	5.0			
	BAPI	*Baccharis pilularis*	43	0.7	0.2	7.0			
	ERCI5	*Eriogonum cinereum*	39	1.1	0.2	6.0			
	SAME3	*Salvia mellifera*	39	1.1	0.2	8.0			
	CEME	*Ceanothus megacarpus*	26	0.9	1.0	7.0			
	CESP	*Ceanothus spinosus*	26	0.3	0.2	3.0			
	RHIN2	*Rhus integrifolia*	22	1.7	2.0	18.0			
	CEBE3	*Cercocarpus betuloides*	22	0.8	0.2	8.0			
	RHOV	*Rhus ovata*	22	0.2	0.2	3.0			
	YUWH	*Yucca whipplei*	22	0.2	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	22	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	65	1.8	0.2	12.0			
	MEIM	*Melica imperfecta*	22	0.4	0.2	7.0			
	CEME2	*Centaurea melitensis*	22	0.3	0.2	4.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus plummerae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Nicotiana glauca, Foeniculum vulgare, Eucalyptus, Conium maculatum, Carduus pycnocephalus, Brassica nigra, Marrubium vulgare, Phalaris aquatica, Piptatherum miliaceum, Silybum marianum, Stellaria media

Samples Used in Description: (n = 23)
AA0020cc, AA0555, AA0942, AA0946, rap0092, rap0095, rap0289, rap0486, rap0837, rap1188, rap1260, rap1666, rap1674, rap1864, rap1905, rap1907, rap1910, rap1985, rap2272m, rap2441, rap2495, rap2509, rap2808

Comments:
This is the first time *Mimulus aurantiacus* has been identified at the alliance level in California. These stands are so heavily dominated by this species that there is little doubt that this is a distinct type. However, it is generally related to other coastal sage scrub alliances. It appears on generally steep, often somewhat unstable slopes in relatively mesic settings within the general vicinity of stands of *Artemisia californica* and *Salvia leucophylla* alliances. It also appears to be closely associated with recent burns in many cases and often occurs adjacent to stands of *Quercus agrifolia* woodland. In some cases, this type also appears to be associated with natural ground disturbance such as rockslides. Two phases have been described that have relatively higher cover of either *Malosma laurina* or *Salvia leucophylla*.

Phases:
Mimulus aurantiacus-Malosma laurina (Bush Monkey Flower-Laurel Sumac) Phase [2172]
Mimulus aurantiacus-Salvia leucophylla (Bush Monkey Flower-Purple Sage) Phase [2171]

COMMON NAME	Bush Monkey Flower Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Mimulus aurantiacus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is likely to occur throughout much of cismontane central and southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Small stands of this alliance have been seen as far north as Contra Costa County (Keeler-Wolf 2005, personal observation). These also occur on steep slopes and include *Artemisia californica*.
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References:
None

Opuntia spp.-Mixed Coastal Sage Scrub Shrubland Association

Coast Prickly Pear-Mixed Coastal Sage Scrub Shrubland Association
***Opuntia* spp. Shrubland Alliance**
Coast Prickly Pear Shrubland Alliance

Mapping Code: 2412

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 10–310 m. It is characterized by a dominance of *Opuntia* spp. (primarily *O. littoralis*, but occasionally *O. oricola* or both) in the shrub layer. The herbaceous layer is generally composed of a variety of nonnative species at low cover. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 10–310 m, mean 175.6 m
Aspect: southeast and southwest
Slope: range 15–40 degrees, mean 26.7 degrees
Topography (micro; macro): convex, flat, or undulating; lower slope to ridgetop
Litter Cover: range 15–55%, mean 28.6%
Small Rock Cover: range 2–50%, mean 17.5%
Large Rock Cover: range 0–70%, mean 7.6%
Bare Ground: range 0–75%, mean 33.9%
Parent Material: igneous
Soil Texture: fine clay to moderately fine clay loam

Vegetation Description:
Stands of *Opuntia* spp.-Mixed Coastal Sage Scrub Shrubland form an open continuous shrub layer (14–67%, mean 39%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–27%, mean 6%) at 0–2 m tall. Trees are frequently emergent (0–8% cover, mean 0.7%) with hardwoods at 0–10 m tall. Total vegetation cover is 21–75%, mean cover is 45.5%.

In this association, the shrub layer usually contains *Opuntia littoralis* and *Eriogonum fasciculatum*. *Artemisia californica, Yucca whipplei, Rhus integrifolia,* and *Encelia californica* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Schinus molle* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Hirschfeldia incana, Bromus madritensis, Brassica nigra, Melica imperfecta, Dudleya pulverulenta,* and *Nassella pulchra*.

***Opuntia* spp.*-Mixed Coastal Sage Scrub* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	OPLI3	*Opuntia littoralis*	73	15.1	5.0	52.0	X		
	ERFA2	*Eriogonum fasciculatum*	73	3.9	0.2	15.0			
	ARCA11	*Artemisia californica*	60	2.9	0.2	17.0			
	YUWH	*Yucca whipplei*	52	0.7	0.2	5.0			
	ENCA	*Encelia californica*	50	1.6	0.2	15.0			
	RHIN2	*Rhus integrifolia*	50	1.3	0.2	15.0			
	OPOR	*Opuntia oricola*	43	4.0	0.2	25.0			
	MALA6	*Malosma laurina*	40	1.7	0.2	21.0			
	SAME5	*Sambucus mexicana*	35	0.6	0.2	7.5			
	LOSC2	*Lotus scoparius*	32	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	30	0.9	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	28	1.1	0.2	15.0			
	BAPI	*Baccharis pilularis*	28	0.3	0.2	5.0			
	SAME3	*Salvia mellifera*	25	1.0	0.2	22.0			
	OPPR	*Opuntia prolifera*	22	0.6	0.2	7.0			
Herb									
	HIIN3	*Hirschfeldia incana*	32	0.3	0.2	5.0			X
	BRMA3	*Bromus madritensis*	28	0.7	0.2	8.0			X
	NASSE	*Nassella*	22	0.5	0.2	7.5			
	MEIM	*Melica imperfecta*	20	0.9	0.2	10.0			
	BRNI	*Brassica nigra*	20	0.1	0.2	1.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 40 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 2 of 40 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Bromus madritensis, Brassica nigra, Centaurea melitensis, Foeniculum vulgare, Schinus molle, Carduus pycnocephalus, Avena, Bromus hordeaceus, Avena fatua, Nicotiana glauca, Cirsium vulgare, Erodium, Lactuca serriola, Marrubium vulgare, Pennisetum setaceum, Anagallis arvensis, Conyza canadensis, Cortaderia, Erodium cicutarium, Galium aparine, Ricinus communis, Silene gallica, Sonchus oleraceus, Vicia villosa

Samples Used in Description: (n = 40)
AA0003cc, AA0255cc, AA0283cc, AA0332, AA0382cc, AA0423, AA0613, AA0630, AA0679, rap0072, rap0090, rap1097, rap1129, rap1204m, rap1427, rap1428, rap1454, rap1757m, rap1758, rap1759, rap1760, rap1761, rap1767m, rap1831, rap2226, rap2251, rap2373, rap2492, rap2600, rap2648, rap2668, rap2695, rap2740, rap2746, rap2817, rap2863rlv, rap2899, rap2900, rap2901, rap2929

Comments:
This association describes the local succulent-dominated scrub. Difficulty in identifying the difference between *Opuntia littoralis* (and hybrids) from *O. oricola* (and hybrids) through binoculars has led to the nonspecific naming of the association. As a general rule, it appeared that the densest stands were dominated by *O. littoralis* and the more open stands often contained more *O. oricola. Nassella pulchra*, although not often found in mixed stands with shrubs, was sometimes seen in this type. Certain stands appear to have higher frequency of *Opuntia prolifera* (coastal cholla), although these did not segregate from the main cluster of samples in the quantitative analysis. The best and densest stands of this association occur on the northwestern portion of the study area usually on Conejo volcanics. These thickets are not to be taken lightly when considered for sampling.

Phases:
None

COMMON NAME	Coast Prickly Pear-Mixed Coastal Sage Scrub Shrubland Association
SYNONYM	Maritime Succulent Scrub (in part) (Holland 1996)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Succulent extremely xeromorphic evergreen shrubland
ALLIANCE	*Opuntia littoralis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (Hybrids and uncertain identification of key species beyond subgenus level)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution are not available without additional inventory. Other similar stands of maritime cactus scrub occur south and east through the western Los Angeles Basin to San Diego County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description

Comments:
These stands dominated by *playtopuntias* (either *Opuntia littoralis* or *O. oricola*) are not to be confused with the stands of more Baja California floristic affinities that occur in San Diego County and on some of the southern Channel Islands. The local stands provide excellent habitat for the coastal cactus wren. These stands are placed in the *O. littoralis* Alliance (c.f., Sawyer and Keeler-Wolf 1995) despite the uncertainty of some of the *Opuntia* species in some of the stands.

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Prunus ilicifolia-Heteromeles arbutifolia Shrubland Association

Holly Leaf Cherry-Toyon Shrubland Association
***Prunus ilicifolia* Shrubland Alliance**
Holly Leaf Cherry Shrubland Alliance

Mapping Code: 2121

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 281–667 m. It is characterized by a dominance or codominance of *Prunus ilicifolia* along with *Heteromeles arbutifolia* in the shrub layer. The herbaceous layer may have native grasses, such as *Leymus condensatus* and *Melica imperfecta*, at low cover. The emergent tree layer includes *Umbellularia californica* and *Quercus agrifolia* at low cover in some of the stands.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Simi Hills Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 281–667 m., mean 475 m
Aspect: northeast and northwest
Slope: range 15–45 degrees, mean 32.7 degrees
Topography (micro; macro): undulating; bottom to upper slope
Litter Cover: no data
Small Rock Cover: range 5–5%, mean 5%
Large Rock Cover: range 0–6%, mean 3%
Bare Ground: range 5–15%, mean 10%
Parent Material: sedimentary or igneous
Soil Texture: medium loam

Vegetation Description:
Stands of *Prunus ilicifolia-Heteromeles arbutifolia* Shrubland form an open to intermittent shrub layer (15–61%, mean 38.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–40%, mean 5.6%) at 0–1 m tall. Trees are occasionally emergent (0–32% cover, mean 4.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–65%, mean cover is 48.4%.

In this association, the shrub layer is characterized by *Prunus ilicifolia* and *Heteromeles arbutifolia. Cercocarpus betuloides, Mimulus aurantiacus, Ceanothus oliganthus,* and *Toxicodendron diversilobum* are frequently included in this layer. The tree layer is emergent and open and may include *Umbellularia californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Melica imperfecta, Leymus condensatus,* and *Hirschfeldia incana.*

***Prunus ilicifolia-Heteromeles arbutifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	55	1.0	0.2	6.0	X		
	QUAG-T	*Quercus agrifolia*	27	0.7	1.0	5.0			
Shrub									
	PRIL	*Prunus ilicifolia*	100	14.0	4.0	28.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	100	7.1	1.0	18.0		X	
	CEBE3	*Cercocarpus betuloides*	73	4.3	3.0	16.0			
	MIAU	*Mimulus aurantiacus*	64	1.0	0.2	3.0			
	CEOL	*Ceanothus oliganthus*	55	2.5	1.0	11.0			
	TODI	*Toxicodendron diversilobum*	55	0.6	0.2	3.0			
	RHOV	*Rhus ovata*	45	2.2	1.0	15.0			
	ADFA	*Adenostoma fasciculatum*	45	0.7	1.0	3.0			
	MALA6	*Malosma laurina*	45	0.3	0.2	2.0			
	CECR	*Ceanothus crassifolius*	36	1.5	0.2	7.0			
	KECO	*Keckiella cordifolia*	36	0.2	0.2	1.0			
	CESP	*Ceanothus spinosus*	27	1.2	0.2	10.0			
Herb									
	MEIM	*Melica imperfecta*	36	3.8	0.2	40.0			
	LECO12	*Leymus condensatus*	27	0.2	0.2	2.0			

Other Noteworthy Species:
Juglans californica was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Avena, Centaurea melitensis, Carduus pycnocephalus, Centaurea solstitialis, Piptatherum miliaceum, Spartium junceum

Samples Used in Description: (n = 11)
AA0770, rap0553m, rap2229m, rap2324, rap2365, rap2402, rap2413, rap2422, rap2426, rap2624, rap2638

Comments:
This is one of the most mesic of the local chaparral associations. It tends to occur at higher elevations and only on northerly facing slopes, especially in narrow gorges or rock crevasses.

Phases:
None

COMMON NAME	Holly Leaf Cherry-Toyon Shrubland Association
SYNONYM	Toyon-Holly Leaf Cherry Alliance (Borchert et al. 2004)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Prunus ilicifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
Central and south coast (including Santa Barbara, Ventura, and western Riverside counties), peninsular ranges (including western Riverside County: San Jacinto foothills, San Diego County: western foothills)

Nations:
United States

States or Provinces:
CA

Environmental Description:
Based on the western Riverside County description of Klein and Evens 2005, the following additional information may be provided on the environmental definition of this association: Elevation is usually below 1,000 m. Aspect is usually north-facing, and slopes are moderate to somewhat steep. Topography is usually concave, mid to upper slopes. Rock cover is relatively high in most stands, derived from granite, sedimentary, or metamorphic parent material. Soil texture is usually sandy loam to loam.

Vegetation Description:
This association has been described by Klein and Evens 2005 from western Riverside County. The following description is excerpted from their study: In the *Prunus ilicifolia-Heteromeles arbutifolia* Association, *Prunus ilicifolia* dominates or codominates in the overstory shrub layer, and *Heteromeles arbutifolia* is present at low cover. A variety of other species may intermix as subdominant shrubs, such as *Eriogonum fasciculatum*, *Toxicodendron diversilobum*, *Keckiella antirrhinoides*, *Adenostoma fasciculatum*, *Salvia apiana*, *and Salvia mellifera*. *Bowlesia incana*, *Marah macrocarpus*, *Muhlenbergia rigens*, *Leymus condensatus,* and nonnative *Bromus madritensis* are examples of species that may occur in the herb layer. This association has also been described from San Diego County (Evens and San 2005) with similar characteristics.

Comments:
Elsewhere *Prunus ilicifolia* stands may reach great age and become semiarborescent (sensu mainland cherry stands Sawyer and Keeler-Wolf 1995). Most of the SAMO stands appear to have burned in the relatively recent past and are multistemmed. Borchert et al. 2004 describe this same vegetation type as a *Prunus ilicifolia-Heteromeles arbutifolia* Alliance, and they separate it from two other similar alliances: the *Ceanothus megacarpus-Prunus ilicifolia* Alliance and the *Cercocarpus betuloides-Prunus ilicifolia* Alliance. All three of these mixed alliances will be treated by Sawyer et al. (2006 MS) as a part of the *Prunus ilicifolia* Alliance, which allows for codominance of other species with *P. ilicifolia*. The rationale behind this involves similar mesic

conditions for all of these and, apparently, low variance within each one of these types not requiring further differentiation into alliances but into associations of the *Prunus ilicifolia* Alliance.

References:
Borchert et al. 2004, Evens and San 2005, Klein and Evens 2005, Sawyer et al. 2006 MS

Quercus berberidifolia Shrubland Association

Scrub Oak Shrubland Association
***Quercus berberidifolia* Shrubland Alliance**
Scrub Oak Shrubland Alliance

Mapping Code: 2161

Local Description

Summary:
This shrubland association occurs on gentle to very steep northwest- and northeast-facing slopes at low to middle elevations between 119–783 m. It is characterized by strong dominance of *Quercus berberidifolia* in the shrub layer. The herbaceous layer is sparse and has no characteristic species. The emergent tree layer includes *Quercus agrifolia* in some stands.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Dry Inland, Eastern Urban, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 119–783 m, mean 342.2 m
Aspect: northwest and northeast
Slope: range 1–55 degrees, mean 23.6 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 50–80%, mean 68.3%
Small Rock Cover: range 0–30%, mean 6.6%
Large Rock Cover: range 0–80%, mean 3.4%
Bare Ground: range 0–42%, mean 15.3%
Parent Material: sedimentary
Soil Texture: coarse loamy sand to fine clay

Vegetation Description:
Stands of *Quercus berberidifolia* Shrubland form an open to continuous shrub layer (8–70%, mean 51.1%). Shrubs occur in two different strata with low shrubs at 0–5 m tall and tall shrubs at 1–10 m tall. The herbaceous layer is open to intermittent (0–48%, mean 3%) at 0–1 m tall. Trees are occasionally emergent (0–24% cover, mean 2.1%) with conifers at 0–10 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 15–78%, mean cover is 55.7%.

In this association, the shrub layer is dominated by *Quercus berberidifolia. Heteromeles arbutifolia* also often occurs in the shrub layer. Other shrubs occasionally include *Adenostoma fasciculatum*, *Rhus ovata, Salvia leucophylla, Ceanothus spinosus, Toxicodendron diversilobum,* and *Malosma laurina*. The tree layer is emergent and open and sometimes includes *Quercus agrifolia, Juglans californica,* and *Quercus lobata* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Bromus madritensis, Brassica nigra, Bromus diandrus, Marah macrocarpus, Hemizonia fasciculata, Melica imperfecta,* and *Hirschfeldia incana.*

***Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	0.9	0.2	10.0			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	35.0	3.0	68.0	X		
	HEAR5	*Heteromeles arbutifolia*	78	3.5	0.2	13.0	X		
	ADFA	*Adenostoma fasciculatum*	56	3.2	1.0	25.0			
	RHOV	*Rhus ovata*	46	1.3	0.2	15.0			
	SALE3	*Salvia leucophylla*	37	0.8	0.2	9.0			
	CESP	*Ceanothus spinosus*	30	0.7	0.2	7.0			
	TODI	*Toxicodendron diversilobum*	26	0.5	0.2	10.0			
	CEBE3	*Cercocarpus betuloides*	22	0.6	0.2	7.0			
	MALA6	*Malosma laurina*	22	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	20	0.4	0.2	7.0			
	SAME5	*Sambucus mexicana*	20	0.2	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	31	0.4	0.2	6.0			X

Other Noteworthy Species:
Baccharis malibuensis was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-3-3. Global rank is G1, and state rank is S1.1 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus diandrus, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Avena, Avena fatua, Bromus hordeaceus, Marrubium vulgare, Nicotiana glauca, Stellaria media, Carduus pycnocephalus, Eucalyptus, Galium aparine, Robinia, Schinus molle, Spartium junceum, Anagallis arvensis, Centaurea solstitialis, Conium maculatum, Conyza canadensis, Erodium cicutarium, Foeniculum vulgare, Melilotus, Melilotus indicus, Phoenix canariensis, Piptatherum miliaceum, Salsola tragus, Senecio argutus

Samples Used in Description: (n = 54)
AA0021cc, AA0040cc, AA0085cc, AA0086cc, AA0087cc, AA0399cc, AA0471cc, AA0756cc, AA0975, AA0994, AA1011, AA1094, AA1134, AA1179, rap0248, rap0291, rap0298, rap0299, rap0306, rap0336, rap0337, rap0340, rap0454, rap0461m, rap0505, rap0602, rap0830, rap1583, rap1621, rap1633, rap1637, rap1640m, rap1792, rap1826, rap1897m, rap1899, rap1915, rap2002, rap2004, rap2153, rap2155, rap2195, rap2210, rap2241, rap2316, rap2377, rap2445, rap2679, rap2687, rap2815, rap2832, rap2835, rap2843, rap2912

Comments:
This association is a common mesic chaparral locally and has been found in many other parts of central and southern California. It is easily distinguished from the related *Q. berberidifolia-Ceanothus spinosus* Association and the *Q. berberidifolia-Cercocarpus betuloides* Association. In this association, *Q. berberidifolia* usually forms a dense cover, with neither *C. betuloides* nor *C. spinosus* even approaching codominance. Additional phases have been identified with relatively higher cover of either *Heteromeles arbutifolia* or *Adenostoma fasciculatum*. However, both of these species tend to remain as subdominants to *Q. berberidifolia*.

Phases:
Quercus berberidifolia-Adenostoma fasciculatum (Scrub Oak-Chamise) Phase [2163]
Quercus berberidifolia-Heteromeles arbutifolia (Scrub Oak Toyon) Phase [2164]
Quercus berberidifolia (Scrub Oak) Phase [2161]

COMMON NAME	Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as San Diego County (Evens and San 2005), Riverside County (Klein and Evens 2005), other parts of the eastern transverse and peninsular ranges (Gordon and White 1994), and north and westward to the northern range districts of the Los Padres National Forest (Borchert et al. 2004). It is likely that the same association occurs north well into the central and inner northern coast ranges (Thorne et al. 2004, Sawyer and Keeler-Wolf 1995).

Nations:
United States

States or Provinces:
CA

Environmental Description:
Additional information summary from Klein and Evens (2005) for the *Q. berberidifolia* Alliance follows:

Elevation is below 1,500 m. Aspect is usually northerly and less often southerly. It is found on moderate to steep slopes, and topography is variable. Ground cover especially contains a

moderate to high litter content. Parent material is more often sedimentary, less often granitic, metamorphic, gabbro-diorite, or metavolcanic. Soil texture varies from loamy sand to clay.

Vegetation Description:
Quercus berberidifolia is the sole dominant shrub in the intermittent to continuous shrub layer. A variety of other chaparral, coastal sage, and desert shrub species may be present, the most common being *Adenostoma fasciculatum*, *Salvia mellifera, Heteromeles arbutifolia, Rhamnus crocea,* and *Eriogonum fasciculatum.* The most common herb species include nonnative annuals *Hirschfeldia incana*, *Bromus diandrus*, *Bromus madritensis*, or *Bromus tectorum*, though natives such as *Marah macrocarpus* and *Paeonia californica* are also usually present (Klein and Evens 2005, Evens and San 2005).

Comments:
There may be some minor local variation in this widespread association based on locally distributed, low-constancy species. Sufficient sampling has yet to be done in the northern part of its range.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995, Thorne et al. 2004

Quercus berberidifolia-Ceanothus spinosus Shrubland Association

Scrub Oak-Greenbark Ceanothus Shrubland Association
***Quercus berberidifolia* Shrubland Alliance**
Scrub Oak Shrubland Alliance

Mapping Code: 2167

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 230–563 m. It is characterized by a codominance of *Quercus berberidifolia* and *Ceanothus spinosus* in the shrub layer. The simple herbaceous layer often has the vine *Marah macrocarpa*. The emergent tree layer occasionally includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 230–563 m, mean 429.4 m
Aspect: variable
Slope: range 15–35 degrees, mean 26 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 3–15%, mean 7.3%
Large Rock Cover: range 0–2%, mean 1%
Bare Ground: range 10–20%, mean 13%
Parent Material: sedimentary, igneous, metamorphic, and quaternary
Soil Texture: coarse loamy sand to moderately fine silty clay loam

Vegetation Description:
Stands of *Quercus berberidifolia-Ceanothus spinosus* Shrubland form an intermittent to continuous shrub layer (41–65%, mean 56.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–33%, mean 3.9%) at 0–0.5 m tall. Trees are occasionally emergent (0–5% cover, mean 1%) with hardwoods at 0–10 m tall. Total vegetation cover is 45–65%, mean cover is 59.3%.

In this association, the shrub layer is characterized by *Quercus berberidifolia, Ceanothus spinosus, Heteromeles arbutifolia,* and *Adenostoma fasciculatum. Rhus ovata, Cercocarpus betuloides, Malosma laurina, Rhamnus ilicifolia,* and *Salvia mellifera* are occasionally included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus, Bromus madritensis, Centaurea melitensis, Piptatherum miliaceum,* and *Stellaria media*.

***Quercus berberidifolia-Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	0.6	1.0	3.0			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	22.6	8.0	40.0	X	X	
	CESP	*Ceanothus spinosus*	100	16.8	10.0	25.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	92	4.8	0.2	14.0		X	
	ADFA	*Adenostoma fasciculatum*	75	4.3	0.2	12.0		X	
	RHOV	*Rhus ovata*	50	1.1	0.2	6.0			
	CEBE3	*Cercocarpus betuloides*	42	0.9	0.2	5.0			
	MALA6	*Malosma laurina*	33	0.1	0.2	1.0			
	RHIL	*Rhamnus ilicifolia*	25	0.1	0.2	1.0			
	SAME3	*Salvia mellifera*	25	0.1	0.2	1.0			
	PRIL	*Prunus ilicifolia*	25	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	42	0.7	0.2	3.0			
	BRMA3	*Bromus madritensis*	25	0.2	0.2	2.0			X

Other Noteworthy Species:
Juglans californica was found in 1 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Stellaria media, Piptatherum miliaceum, Ailanthus altissima, Bromus diandrus, Anagallis arvensis, Brassica nigra, Galium aparine, Hirschfeldia incana, Sonchus oleraceus

Samples Used in Description: (n = 12)
AA1171, rap0244, rap0290m, rap0535m, rap0559m, rap1552, rap1553, rap1589, rap1590, rap1639m, rap2256m, rap2663

Comments:
This is an endemic association to the western transverse ranges, probably centered in the Santa Monica Mountains. It differs from the related *Ceanothus spinosus* Alliance by having dominance to codominance of *Q. berberidifolia*. It stands to reason that these two shrub species would comingle because both are mesophytic and resprout after fire.

Phases:
None

COMMON NAME	Scrub Oak-Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus berberidifolia-Adenostoma fasciculatum Shrubland Association

Scrub Oak-Chamise-Shrubland Association
***Quercus berberidifolia-Adenostoma fasciculatum* Shrubland Alliance**
Scrub Oak-Chamise Shrubland Alliance

Mapping Code: 2581

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 299–764 m. It is dominated by *Adenostoma fasciculatum* and *Quercus berberidifolia* in the shrub layer with a sparse herbaceous layer. The emergent tree layer includes *Quercus agrifolia.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 299–764 m, mean 451 m
Aspect: variable
Slope: range 2–40 degrees, mean 19.3 degrees
Topography (micro; macro): flat, undulating, concave, or convex; mid slope to ridgetop
Litter Cover: range 35–35%, mean 35%
Small Rock Cover: range 5–45%, mean 22.7%
Large Rock Cover: range 0–12%, mean 3.7%
Bare Ground: range 10–38%, mean 21.9%
Parent Material: sedimentary or igneous, occasionally quaternary
Soil Texture: moderately fine sandy to silty clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Quercus berberidifolia* Shrubland form an open to intermittent shrub layer (20–55%, mean 42.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–18%, mean 2.2%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–15 m tall. Total vegetation cover is 20–55%, mean cover is 44.9%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum* and *Quercus berberidifolia. Salvia mellifera* and *Heteromeles arbutifolia* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus, Centaurea melitensis, Bromus madritensis*, and *Nassella lepida*.

***Quercus berberidifolia-Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.1	0.2	1.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	24.0	6.0	44.0	X	X	
	QUBE5	*Quercus berberidifolia*	100	7.2	1.0	12.0		X	
	SAME3	*Salvia mellifera*	60	2.5	0.2	15.0			
	HEAR5	*Heteromeles arbutifolia*	55	1.2	0.2	6.0			
	MALA6	*Malosma laurina*	50	0.9	0.2	4.0			
	YUWH	*Yucca whipplei*	45	0.5	0.2	4.0			
	LOSC2	*Lotus scoparius*	40	0.8	0.2	7.0			
	RHOV	*Rhus ovata*	40	0.3	0.2	2.0			
	ARGL3	*Arctostaphylos glandulosa*	30	1.4	0.2	9.0			
	CESP	*Ceanothus spinosus*	30	0.5	0.2	3.0			
	CEME	*Ceanothus megacarpus*	30	0.3	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	25	0.4	0.2	7.0			
	CEBE3	*Cercocarpus betuloides*	25	0.4	0.2	5.0			
	SALE3	*Salvia leucophylla*	25	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	20	0.2	0.2	4.0			
Herb									
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	1.0			

Other Noteworthy Species:
Calochortus plummerae was found in 1 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Avena fatua, Avena, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Eucalyptus, Schinus molle

Samples Used in Description: (n = 20)
AA0312cc, AA0636, rap0264, rap0268, rap0275, rap0331, rap0503m, rap0858, rap1636, rap1986, rap2070, rap2097, rap2194m, rap2233, rap2240, rap2351, rap2417, rap2587, rap2664, rap2792

Comments:
Stands of this association in the Santa Monica Mountains tend to be dominated by *Adenostoma fasciculatum* with a lower cover (on the average less than half as much) of *Q. berberidifolia.* This is in contrast to stands described by Gordon and White 1994, Borchert et al. 2004, Evens and San 2005, and Klein and Evens 2005 where both species codominate usually at > 20% cover each. Because many species are shared and the environmental conditions are similar, we

decided to maintain a conservative approach to naming this association rather than describing a new association of the *Adenostoma fasciculatum* alliance with *Q. berberidifolia* as a subordinate.

Phases:
None

COMMON NAME	Chamise-Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia-Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and several other areas within the central and southern coastal California region. This includes western Riverside (Klein and Evens 2005), San Diego (Evens and San 2005), Los Angeles, Santa Barbara, San Luis Obispo, Ventura, and Monterey counties (Borchert et al. 2004, Gordon and White 1994). It is probably most extensive in the peninsular ranges (western Riverside County: Santa Ana Mountains, San Jacinto Mountains and foothills; San Diego County: western foothills and Palomar-Cuyamaca Peak regions).

Nations:
United States

States or Provinces:
CA

Environmental Description:
In the Los Padres National Forest of Monterey and San Luis Obispo counties (Borchert et al. 2004), the scrub oak-chamise alliance is common in the interior portions of the coast ranges, especially in the Sierra Madre Mountains and Garcia Mountains of the San Luis Obispo Ranger District and in the eastern Monterey Ranger District. Most stands occur below elevations of 1,100 m on middle and upper slope positions. Aspects vary but tend to be north facing. Slopes are generally greater than 20 degrees.

Vegetation Description:
In addition to the codominance of the two main species, a variety of coastal sage and chaparral shrubs (e.g., *Rhamnus ilicifolia*, *Salvia mellifera, Lonicera subspicata*, *Rhus ovata*, *Heteromeles*

arbutifolia, *Eriogonum fasciculatum*) may occur at low cover in the open to continuous shrub layer.

Comments:
There is some confusion about the proper nomenclature for this association and the alliance it is within. The confusion comes from the inversion of the names of the two dominant and characteristic species. The *Adenostoma fasciculatum-Quercus berberidifolia* Association has been described by Gordon and White 1994, while the *Quercus berberidifolia-Adenostoma fasciculatum* Alliance and Association have been described by Sawyer and Keeler-Wolf 1995, Evens and San 2005, and Klein and Evens 2005. Both apparently refer to the same vegetation. The former association has been defined to describe the stands where *A. fasciculatum* clearly dominates but *Q. berberidifolia* is present in low cover. This situation is more the norm for the Santa Monica Mountains stands. However, we have chosen to subsume this as an association within the broader mixed *Q. berberidifolia-A. fasciculatum* Alliance because of the overall similarity in species composition and environmental variables.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Quercus berberidifolia-Cercocarpus betuloides Shrubland Association

Scrub Oak-Birch Leaf Mountain Mahogany Shrubland Association
***Quercus berberidifolia-Cercocarpus betuloides* Shrubland Alliance**
Scrub Oak-Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2591

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 223–314 m. It is characterized by dominance to codominance of *Quercus berberidifolia* with subdominance to codominance of *Cercocarpus betuloides* in the shrub layer. The herbaceous layer may have mesophytic species such as *Melica imperfecta* and *Marah macrocarpa*, but no characteristic herbs have been identified. The emergent tree layer may include *Quercus agrifolia, Juglans californica,* and small trees of *Fraxinus dipetala*.

Distribution:
This association is sampled in the Eastern Urban and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 223–314 m, mean 282.4 m
Aspect: northeast and northwest
Slope: range 15–35 degrees, mean 29.7 degrees
Topography (micro; macro): undulating or flat; lower to upper slope
Litter Cover: range 60–65%, mean 62.5%
Small Rock Cover: range 0–10%, mean 5%
Large Rock Cover: no data
Bare Ground: range 0–45%, mean 26.3%
Parent Material: igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Quercus berberidifolia-Cercocarpus betuloides* Shrubland form an intermittent to continuous shrub layer (46–62%, mean 51%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 2–5 m tall. The herbaceous layer is open (0–7%, mean 2%) at 0–0.5 m tall. Trees are occasionally emergent (0–15% cover, mean 3%) with hardwoods at 0–10 m tall. Total vegetation cover is 48–65%, mean cover is 55.8%.

In this association, the shrub layer is characterized by *Quercus berberidifolia, Cercocarpus betuloides, Rhus ovata,* and *Heteromeles arbutifolia*. *Malosma laurina, Ceanothus spinosus*, *Toxicodendron diversilobum, Ceanothus cuneatus, Mimulus aurantiacus,* and *Adenostoma fasciculatum* are occasionally included in this layer. The tree layer is emergent and open and can include *Quercus agrifolia, Juglans californica,* and *Fraxinus dipetala* at low cover. The herbaceous layer is simple and may include *Melica imperfecta, Centaurea melitensis*, and *Marah macrocarpus.*

***Quercus berberidifolia-Cercocarpus betuloides* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	38	1.5	0.2	7.5			
	JUCA-T	*Juglans californica*	38	0.5	0.2	2.5			
Tree Understory									
	FRDI2	*Fraxinus dipetala*	25	0.8	2.0	4.0			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	24.5	15.0	31.0	X	X	
	CEBE3	*Cercocarpus betuloides*	100	12.9	8.0	17.0		X	
	RHOV	*Rhus ovata*	88	3.7	0.2	8.0		X	
	HEAR5	*Heteromeles arbutifolia*	75	3.2	0.2	7.5		X	
	MALA6	*Malosma laurina*	38	0.8	0.2	5.0			
	CESP	*Ceanothus spinosus*	38	0.6	1.0	3.0			
	TODI	*Toxicodendron diversilobum*	38	0.5	0.2	2.5			
	CECU	*Ceanothus cuneatus*	25	2.5	5.0	15.0			
	MIAU	*Mimulus aurantiacus*	25	0.6	2.0	2.5			
	ADFA	*Adenostoma fasciculatum*	25	0.1	0.2	0.2			
Herb									
	MEIM	*Melica imperfecta*	25	0.5	1.0	3.0			
	CEME2	*Centaurea melitensis*	25	0.2	0.2	1.0			X
	POACXX	*Poaceae*	25	0.2	0.2	1.0			
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 8 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Senecio mikanioides, Bromus madritensis, Eucalyptus, Galium aparine

Samples Used in Description: (n = 8)
AA0156cc, AA0590, AA1183, rap0739m, rap0741, rap0742, rap2254m, rap2806

Comments:
This vegetation type is most frequently seen in inland, low-elevation locales such as the Malibu Creek drainage.

Phases:
None

COMMON NAME	Scrub Oak-Birch Leaf Mountain Mahogany Shrubland Association
SYNONYM	*Quercus berberidifolia-Cercocarpus betuloides* Alliance (Gordon and White, Sawyer and Keeler-Wolf 1995)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland

PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia-Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is known from the Main Division of the Los Padres National Forest (Borchert et al. 2004) and western Riverside County (Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
The following information has been provided for the broader alliance concept of *Q. berberidifolia-C. betuloides* as described by Klein and Evens 2005. It includes further variation not present in the Santa Monica Mountains study area: Elevation is below 1,500 m with aspect usually northerly, rarely southerly. Slope is moderate to steep, and topography is variable. Parent material is more often granite, less often metamorphic, sedimentary, gabbro, diorite, or metavolcanic. Soil texture is more often sandy loam but varies from sandy loam to clay loam.

Vegetation Description:
Klein and Evens 2005 have 17 samples to describe the *Q. berberidifolia-Cercocarpus betuloides* Alliance in western Riverside County as follows: Stands of *Quercus berberidifolia-Cercocarpus betuloides* Shrubland form an open to continuous shrub layer (25–87%), where the two species may be codominant or either species may be subdominant to the other. The shrub layer is frequently in two different strata, with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0.2–60%) at 0–1 m tall and includes a variety of native and nonnative herbs. Total vegetation cover is 55–89%.

Comments:
This association has been treated as an alliance/series by Gordon and White 1994, Sawyer and Keeler-Wolf 1995, and Borchert et al. 2004. It is treated as the type association here and in Sawyer et al. 2006 MS. Further variation of stands with both *Q. berberidifolia* and *C. betuloides* was described by Klein and Evens 2005. These include the *Quercus berberidifolia-Cercocarpus betuloides-Arctostaphylos glauca* Association and the *Quercus berberidifolia-Cercocarpus betuloides-Ceanothus crassifolius* Association. These also could be thought of as associations within the *Quercus berberidifolia* Alliance (*sensu lato*).

References:
Borchert et al. 2004, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995, Sawyer et al. 2006 MS

Quercus wislizenii var. *frutescens* Shrubland Alliance

Scrub Interior Live Oak Shrubland Alliance

Mapping Code: 2560

Local Description

Summary:
This shrubland alliance occurs on somewhat steep northeast- and northwest-facing slopes at mid elevations between 623 and 690 m. It is dominated by *Quercus wislizeni* var. *frutescens* in the shrub layer with scattered shrubs of *Ceanothus oliganthus*. The emergent tree layer includes scattered *Quercus agrifolia.*

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 623–690 m, mean 656.5 m
Aspect: northeast and northwest
Slope: range 15–23 degrees, mean 19 degrees
Topography (micro; macro): convex or concave; upper slope
Litter Cover: 30%
Small Rock Cover: 10%
Large Rock Cover: 45%
Bare Ground: 3%
Parent Material: quaternary and sedimentary
Soil Texture: no data

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (18–50%, mean 34%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is bare (0%). Trees are occasionally emergent (5–16% cover, mean 10.5%) with hardwoods at 1–10 m tall. Total vegetation cover is 34–55%, mean cover is 44.5%.

In this association, the shrub layer is characterized by *Quercus wislizeni* var. *frutescens, Adenostoma fasciculatum, Arctostaphylos glandulosa, Ceanothus oliganthus,* and *Heteromeles arbutifolia. Quercus berberidifolia* and *Adenostoma sparsifolium* are occasionally included in this layer. The tree layer is emergent and open and includes *Quercus agrifolia* at low cover. The herbaceous layer is simple, with *Pellaea* sp. as the most abundant.

Quercus wislizeni* var. *frutescens Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	3.0	1.0	5.0	X	X	
Tree Understory									
	QUWI2	*Quercus wislizeni*	100	25.0	15.0	35.0	X	X	
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	4.5	1.0	8.0		X	
	ARGL3	*Arctostaphylos glandulosa*	100	4.1	0.2	8.0		X	
	CEOL	*Ceanothus oliganthus*	100	4.0	2.0	6.0		X	
	HEAR5	*Heteromeles arbutifolia*	100	0.2	0.2	0.2		X	
	QUBE5	*Quercus berberidifolia*	50	2.5	5.0	5.0			
	ADSP	*Adenostoma sparsifolium*	50	1.0	2.0	2.0			
	GAVE2	*Garrya veatchii*	50	0.5	1.0	1.0			
	ARGL4	*Arctostaphylos glauca*	50	0.1	0.2	0.2			
	CEME	*Ceanothus megacarpus*	50	0.1	0.2	0.2			
	KECO	*Keckiella cordifolia*	50	0.1	0.2	0.2			
	LOSC2	*Lotus scoparius*	50	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	50	0.1	0.2	0.2			
	PIMO5	*Pickeringia montana*	50	0.1	0.2	0.2			
	TODI	*Toxicodendron diversilobum*	50	0.1	0.2	0.2			
Herb									
	PELLA	*Pellaea*	50	0.1	0.2	0.2	X		

Other Noteworthy Species:
None

Nonnative Species:
None

Samples Used in Description: (n = 2)
rap2448, rap2801

Comments:
This widespread California alliance is very local at the upper elevations of the Santa Monica Mountains. It would be a likely candidate for monitoring long-term effects of global climate change.

Phases:
None

COMMON NAME	Interior Live Oak Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.c. Sclerophyllous temperate broad-leaved evergreen shrubland

ALLIANCE *Quercus wislizenii* var. *frutescens* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains

CONSERVATION STATUS RANK G5S5

Global Description

Distribution:
This shrubland of cismontane California occurs in the inner north coast range; the foothills of the Cascades and Sierra Nevada Mountains; and the montane Sierra Nevada, transverse, and peninsular ranges.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This shrubland alliance of cismontane California grows between 300 and 1,850 m elevation on all slopes. Substrates are usually derived from bedrock or alluvium and may be rocky. The climate is Mediterranean with cool, moist winters and warm, dry summers. Most precipitation falls as rain between November and May. Yearly rainfall totals vary between 40 and 200 cm in the range of this alliance.

Vegetation Description:
This California chaparral community is dominated by at least 60% relative cover of *Quercus wislizeni*. Other shrubs present may include *Arctostaphylos glauca, Arctostaphylos glandulosa, Cercocarpus montanus* var. *glaber, Aesculus californica, Rhamnus californica, Juniperus californica, Quercus chrysolepis, Adenostoma fasciculatum, Ceanothus leucodermis, Prunus ilicifolia* ssp. *ilicifolia, Rhamnus ilicifolia, Toxicodendron diversilobum, Quercus berberidifolia,* and *Ceanothus cuneatus.* Emergent individual trees could include *Pinus coulteri, Pinus sabiniana,* and *Pinus attenuata*.

Comments:
None

References:
Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Rosa californica Shrubland Alliance
California Rose Shrubland Alliance

Mapping Code: 3010

Local Description

Summary:
One stand of this shrubland alliance occurs on a gentle riparian stream terrace at low elevation (503 m). It is solely dominated by *Rosa californica* in the shrub layer. *Artemisia californica* and *Hirschfeldia incana* occur at low cover in the herbaceous layer, and no species are recorded in the tree layer.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: 503 m
Aspect: flat/none
Slope: 2 degrees
Topography (micro; macro): flat; lower slope/stream terrace
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: igneous
Soil Texture: no data

Vegetation Description:
Stands of *Rosa californica* Shrubland form an open shrub layer (25%). Shrubs occur in two different strata with low shrubs at 0.5–1 m tall and tall shrubs at 1–2 m tall. The herbaceous layer is sparse to open (3%) at 0.5–1 m tall. The tree layer is not recorded. Total vegetation cover is 28%.

In this alliance, the shrub layer is dominated solely by *Rosa californica*. *Sambucus mexicana* exhibits low cover, and other coastal sage species are present at sparse cover. The herbaceous layer is simple with *Artemisia douglasiana* and *Hirschfeldia incana* occurring at low cover, and the tree layer is absent.

Rosa californica Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ROCA2	*Rosa californica*	100	19.0	19.0	19.0	X	X	
	SAME5	*Sambucus mexicana*	100	2.0	2.0	2.0		X	
	ARCA11	*Artemisia californica*	100	0.2	0.2	0.2		X	
	SAME3	*Salvia mellifera*	100	0.2	0.2	0.2		X	
Herb									
	ARDO3	*Artemisia douglasiana*	100	4.0	4.0	4.0	X	X	
	HIIN3	*Hirschfeldia incana*	100	3.0	3.0	3.0	X	X	X

Other Noteworthy Species:
None

Nonnative Species:
Hirschfeldia incana

Samples Used in Description: (n = 1)
rap2388

Comments:
Small stands of this alliance occur on exposed terraces above to stream channels, adjacent to other riparian vegetation.

Phases:
None

COMMON NAME	California Rose Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION	III.B.2.N.c. Intermittently flooded, cold-deciduous shrubland
ALLIANCE	*Rosa californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This alliance has been recorded in southern California from San Diego and Ventura counties and in central California in Suisun Marsh; however, its distribution is not fully known.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands usually occur directly adjacent to stream channels on flat to steep slopes of the stream terraces/banks.

Vegetation Description:
The shrub layer is an open to continuous canopy with sole dominance by *Rosa californica*. Associated shrub species may include *Sambucus mexicana, Symphoricarpos mollis,* and *Salix* sp. The herbaceous layer is usually open and may include wetland species such as *Artemisia douglasiana* or *Urtica dioica*, though they may also include upland species such as *Hirschfeldia incana, Brassica,* and *Bromus* spp. Trees are usually absent.

Comments:
None

References:
Evens and San 2005, Keeler-Wolf and Vaghti 2000

Rhus integrifolia Shrubland Association

Lemonade Berry Shrubland Association
***Rhus integrifolia* Shrubland Alliance**
Lemonade Berry Shrubland Alliance

Mapping Code: 2153

Local Description

Summary:
This shrubland association occurs on gentle to abrupt slopes of variable aspect at low elevations between 5–750 m. It is characterized by a strong dominance of *Rhus integrifolia* in the shrub layer. The herbaceous layer is insignificant but commonly contains *Leymus condensatus.* The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Eastern Urban, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 5–750 m, mean 191.6 m
Aspect: variable
Slope: range 2–75 degrees, mean 30.4 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 25–90%, mean 40.6%
Small Rock Cover: range 0–50%, mean 17%
Large Rock Cover: range 0–55%, mean 9.8%
Bare Ground: range 5–50%, mean 25.1%
Parent Material: igneous
Soil Texture: coarse sand to moderately fine clay loam

Vegetation Description:
Stands of *Rhus integrifolia* Shrubland form an open to continuous shrub layer (6–65%, mean 36.1%). Shrubs occur in two different strata with low shrubs at 0-2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open to intermittent (0–42%, mean 6.7%) at 0–2 m tall. Trees are occasionally emergent (0–14% cover, mean 1.4%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 10–68%, mean cover is 44.3%.

In this association, the shrub layer is characterized by *Rhus integrifolia. Artemisia californica* and *Malosma laurina* are frequently included in this layer. Other shrubs sometimes present include *Salvia mellifera, Heteromeles arbutifolia, Encelia californica, Malacothamnus fasciculatus, Yucca whipplei,* and *Sambucus mexicana*. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Juglans californica*, and *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Centaurea melitensis,* and *Melica imperfecta.*

***Rhus integrifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	RHIN2	*Rhus integrifolia*	100	18.4	2.0	55.0		X	
	ARCA11	*Artemisia californica*	68	1.9	0.2	8.0			
	MALA6	*Malosma laurina*	50	2.8	0.2	16.0			
	SAME3	*Salvia mellifera*	48	1.4	0.2	15.0			
	HEAR5	*Heteromeles arbutifolia*	46	3.0	0.2	27.0			
	ENCA	*Encelia californica*	44	1.0	0.2	7.0			
	MAFA	*Malacothamnus fasciculatus*	34	1.8	0.2	13.0			
	ERCI5	*Eriogonum cinereum*	34	0.9	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	30	0.5	0.2	6.0			
	YUWH	*Yucca whipplei*	30	0.4	0.2	2.5			
	SAME5	*Sambucus mexicana*	30	0.3	0.2	5.0			
	SALE3	*Salvia leucophylla*	22	0.4	0.2	6.0			
	RHIL	*Rhamnus ilicifolia*	22	0.3	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.4	1.0	4.0			
Herb									
	LECO12	*Leymus condensatus*	42	1.4	0.2	20.0			
	CEME2	*Centaurea melitensis*	24	0.5	0.2	8.0			X
	MEIM	*Melica imperfecta*	20	0.4	0.2	4.0			

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 2 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 5 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Brassica nigra, Avena, Erodium cicutarium, Avena fatua, Carpobrotus edulis, Hirschfeldia incana, Bromus diandrus, Pennisetum setaceum, Nicotiana glauca, Ricinus communis, Myoporum laetum, Bromus hordeaceus, Carduus pycnocephalus, Eucalyptus, Foeniculum vulgare, Limonium perezii, Marrubium vulgare, Vicia villosa, Arundo donax, Ageratina adenophora, Cistus, Cortaderia, Melilotus indicus, Mesembryanthemum crystallinum, Sonchus oleraceus, Erodium, Euphorbia terracina, Medicago polymorpha, Picris echioides, Salsola tragus, Schinus molle

Samples Used in Description: (n = 50)
AA0148cc, AA0216cc, AA0220cc, AA0394cc, AA0508, AA0622, AA0737, AA0905, AA0906, AA0956, AA0997, AA1021, AA1197, rap0516, rap0519, rap0638, rap0647, rap0693, rap0725,

rap0734, rap0747, rap0954, rap1037, rap1103m, rap1157, rap1254m, rap1274, rap1470m, rap1474, rap1594, rap1597, rap1601, rap1729, rap1756m, rap1894, rap1908, rap1917, rap1954, rap1955, rap1956m, rap2110, rap2116, rap2117m, rap2118, rap2217, rap2364, rap2585, rap2794, rap2858rlv, rap2923

Comments:
This association of the *R. integrifolia* Alliance is characterized by a strong dominance of lemonade berry. As with other associations in this alliance, it tends to occur close to the coast on steep south-facing slopes. Three phases have been identified. In addition to the pure phase, one is a mixture of the dominant with a subdominance of *Heteromeles arbutifolia,* and the other is a seral postfire phase with *Malacothamnus fasciculatus.* It is similar to the *R. integrifolia-Artemisia californica-Eriogonum cinereum* Association except that the cover of *R. integrifolia* is higher and the constancy of *Eriogonum cinereum* and *A. californica* is substantially lower. This type is occasionally seen in highly disturbed fragments within urbanized areas.

Phases:
Rhus integrifolia-Heteromeles arbutifolia (Lemonade Berry-Toyon) Phase [2158]
Rhus integrifolia-Malacothamnus fasciculatus (Lemonade Berry-Bush Mallow) Phase [7153]
Rhus integrifolia (Lemonade Berry) Phase [2153]

COMMON NAME	Lemonade Berry Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus integrifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance ranges through the coastal hills and terraces of the south coast (including Ventura to San Diego counties). This association is likely to occur elsewhere in this vicinity.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Evens and San 2005

Rhus integrifolia-Artemisia californica-Eriogonum cinereum Shrubland Association

Lemonade Berry-California Sagebrush-Ashy Buckwheat Shrubland Association
***Rhus integrifolia* Shrubland Alliance**
Lemonade Berry Shrubland Alliance

Mapping Code: 7157

Local Description

Summary:
This shrubland association occurs on moderate to abrupt slopes of variable aspect at low elevations between 4–280 m. It is characterized by a dominance of *Rhus integrifolia* and a subdominance of *Artemisia californica* and *Eriogonum cinereum* in the shrub layer. The herbaceous layer is sparse and composed mostly of nonnative grasses and herbs. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 4–280 m, mean 101.8 m
Aspect: variable
Slope: range 8–70 degrees, mean 32.8 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 15–35%, mean 20.6%
Small Rock Cover: range 4–60%, mean 26.4%
Large Rock Cover: range 0–90%, mean 19.1%
Bare Ground: range 1–70%, mean 24.4%
Parent Material: igneous or sedimentary
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (6–58%, mean 29.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (1–26%, mean 6.7%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 7–72%, mean cover is 35.2%.

In this association, the shrub layer is characterized by *Rhus integrifolia, Artemisia californica,* and *Eriogonum cinereum. Malosma laurina, Yucca whipplei,* and *Salvia leucophylla* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus* and *Pennisetum setaceum*.

***Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	RHIN2	*Rhus integrifolia*	100	9.8	2.0	35.0	X		
	ARCA11	*Artemisia californica*	81	3.6	0.2	15.0	X		
	ERCI5	*Eriogonum cinereum*	78	3.5	0.2	15.0	X		
	MALA6	*Malosma laurina*	64	1.4	0.2	9.0			
	YUWH	*Yucca whipplei*	61	1.0	0.2	7.0			
	SALE3	*Salvia leucophylla*	56	5.8	0.2	32.0			
	SAME3	*Salvia mellifera*	47	0.7	0.2	5.0			
	ENCA	*Encelia californica*	42	0.5	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	36	0.6	0.2	4.0			
	COGI	*Coreopsis gigantea*	33	0.5	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.3	0.2	2.5			
	ISAR	*Isomeris arborea*	25	0.1	0.2	1.0			
Herb									
	LECO12	*Leymus condensatus*	39	1.3	0.2	7.5			
	PESE3	*Pennisetum setaceum*	33	1.5	0.2	14.0		X	
	CEME2	*Centaurea melitensis*	22	0.6	0.2	4.0		X	

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 36 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Pennisetum setaceum, Centaurea melitensis, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Avena, Avena fatua, Erodium cicutarium, Nicotiana glauca, Anagallis arvensis, Arundo donax, Brassica, Bromus hordeaceus, Erodium, Foeniculum vulgare, Medicago polymorpha, Melilotus indicus, Myoporum laetum, Ricinus communis, Silybum marianum

Samples Used in Description: (n = 36)
AA0121cc, AA0176cc, AA0215cc, AA0509, AA0617, AA0621, AA0744cc, AA0777, AA0781, AA0870, AA0907, AA0960, AA1014, AA1015, AA1033, rap0511, rap0651, rap0663, rap0665, rap0883, rap0941m, rap1095, rap1096, rap1109m, rap1166, rap1202, rap1277, rap1464, rap1472, rap1478, rap1791m, rap2109, rap2375, rap2537rlv, rap2553, rap2822

Comments:
There is some question about how different this association is from the other two associations defined in this alliance. *R. integrifolia* occupies a fairly distinct setting close to the immediate coast at low elevations and usually on steep slopes including ocean bluffs. The matrix species include *A. californica* and *E. cinereum* to varying degrees in most of the 97 samples taken in this alliance. Another approach to classification of this alliance may be to aggregate all stands in the SAMO study area into an *R. integrifolia-Artemisia californica-Eriogonum cinereum* Association and reduce the additional types described as associations herein to phases. Further analysis of other stands of this alliance in southern California will clarify this issue.

Phases:
Rhus integrifolia-Artemisia californica-Salvia leucophylla (Lemonade Berry-California Sagebrush-Purple Sage) Phase [2155]
Rhus integrifolia-Eriogonum cinereum-Yucca whipplei-Coreopsis gigantea (Lemonade Berry-Ashy Buckwheat-Chaparral Yucca-Giant Coreopsis) Phase [7155]

COMMON NAME	Lemonade Berry-California Sagebrush-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus integrifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. This association is probably endemic to the western transverse ranges of southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar association, the *Rhus integrifolia-Salvia mellifera-Artemisia californica* Association, has been described by Evens and San 2005 in coastal San Diego County. It lacks *Eriogonum cinereum*.

References:
Evens and San 2005

Rhus integrifolia-Opuntia spp.-*Eriogonum cinereum* Shrubland Association

Lemonade Berry-Coast Prickly Pear-Ashy Buckwheat Shrubland Association
***Rhus integrifolia* Shrubland Alliance**
Lemonade Berry Shrubland Alliance

Mapping Code: 2151

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep southeast- and southwest-facing slopes at low elevations between 3–251 m. It is characterized by a codominance of *Rhus integrifolia* and *Opuntia littoralis* and a constant subdominance of *Eriogonum cinereum* in the shrub layer. The herbaceous layer is composed of a mixture of native and nonnative species.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 3–251 m, mean 78.6 m.
Aspect: southeast and southwest
Slope: range 15–60 degrees, mean 35.8 degrees
Topography (micro; macro): undulating, flat, or concave; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 15–40%, mean 27.5%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 5–20%, mean 12.5%
Parent Material: igneous
Soil Texture: clay

Vegetation Description:
Stands of *Rhus integrifolia-Opuntia* spp.*-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (29–60%, mean 42.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–6%, mean 3.5%) at 0–0.5 m tall. Trees are not present. Total vegetation cover is 30–65%, mean cover is 45.6%.

In this association, the shrub layer is characterized by *Opuntia littoralis, Rhus integrifolia,* and *Eriogonum cinereum. Artemisia californica, Yucca whipplei,* and *Encelia californica* are often included in this layer. The tree layer is absent. The herbaceous layer is simple and sometimes includes *Brassica nigra, Pennisetum setaceum, Bromus madritensis, Nassella lepida, Melica imperfecta, Calystegia macrostegia,* and *Foeniculum vulgare.*

***Rhus integrifolia-Opuntia* spp.-*Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	OPLI3	*Opuntia littoralis*	100	15.3	3.0	26.0	X	X	
	RHIN2	*Rhus integrifolia*	100	11.6	1.0	30.0		X	
	ERCI5	*Eriogonum cinereum*	100	5.7	0.2	12.0		X	
	ARCA11	*Artemisia californica*	73	2.3	0.2	12.0			
	YUWH	*Yucca whipplei*	73	1.2	0.2	4.0			
	ENCA	*Encelia californica*	64	1.3	0.2	8.0			
	ERFA2	*Eriogonum fasciculatum*	45	0.4	0.2	3.0			
	SAME5	*Sambucus mexicana*	45	0.4	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	45	0.2	0.2	1.0			
	BRCA3	*Brickellia californica*	45	0.1	0.2	0.2			
	MALA6	*Malosma laurina*	36	1.5	3.0	5.0			
	OPOR	*Opuntia oricola*	27	1.7	1.0	10.0			
	SAME3	*Salvia mellifera*	27	0.6	0.2	4.0			
	ISAR	*Isomeris arborea*	27	0.3	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	55	0.3	0.2	2.0			X
	PESE3	*Pennisetum setaceum*	55	0.3	0.2	2.0			X
	BRMA3	*Bromus madritensis*	36	0.3	0.2	1.0			X
	UNBG	Unknown bunch grass	27	0.7	1.0	5.0			
	NALE2	*Nassella lepida*	27	0.5	1.0	4.0			
	MEIM	*Melica imperfecta*	27	0.5	0.2	3.0			
	CAMA24	*Calystegia macrostegia*	27	0.1	0.2	0.2			
	FOVU	*Foeniculum vulgare*	27	0.1	0.2	0.2			X

Other Noteworthy Species:
Eriogonum crocatum was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Brassica nigra, Pennisetum setaceum, Bromus madritensis, Foeniculum vulgare, Nicotiana glauca, Avena, Centaurea melitensis, Erodium cicutarium, Malva parviflora, Melilotus indicus, Myoporum laetum, Raphanus sativus, Schinus molle

Samples Used in Description: (n = 11)
AA0779, AA0908, rap0933, rap0940, rap1130, rap1131, rap1133, rap1134, rap1257m, rap2225, rap2696

Comments:
This association has similarities with the *Opuntia* spp.-Mixed Coastal Sage Scrub Shrubland Association stands in the study area. However, the cover of *Rhus integrifolia* is much higher, and the general aspect is low elevation on rockier slopes than the *Opuntia* Alliance stands. Stands may often be seen proximate to one another with the *R. integrifolia* Alliance almost always on the steeper and rockier portions of the slope.

Phases:
None

COMMON NAME	Lemonade Berry-Coast Prickly Pear-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus integrifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Rhus ovata Shrubland Association

Sugar Bush Shrubland Association
***Rhus ovata* Shrubland Alliance**
Sugar Bush Shrubland Alliance

Mapping Code: 2193

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southwest- and northwest-facing slopes at low elevations between 194–520 m. It is characterized by a strong dominance of *Rhus ovata* in the shrub layer. The herbaceous layer is generally open with a varying mixture of native and nonnative species. The emergent tree layer includes *Quercus agrifolia* and *Juglans californica* but is usually absent.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Eastern Urban, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 194–520 m, mean 339.8 m
Aspect: southwest and northwest
Slope: range 15–38 degrees, mean 29.3 degrees
Topography (micro; macro): flat, convex, or concave; middle slope
Litter Cover: range 10–70%, mean 40%
Small Rock Cover: range 3–44%, mean 23.5%
Large Rock Cover: range 0–1%, mean 0.5%
Bare Ground: range 27–40%, mean 33.5%
Parent Material: sedimentary
Soil Texture: fine clay

Vegetation Description:
Stands of *Rhus ovata* Shrubland form an open to intermittent shrub layer (8–62%, mean 41.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–17%, mean 4.3%) at 0–1 m tall. Trees are occasionally emergent (0–14% cover, mean 1.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–67%, mean cover is 47.7%.

In this association, the shrub layer is characterized by *Rhus ovata. Malacothamnus fasciculatus*, *Salvia mellifera, Heteromeles arbutifolia,* and *Malosma laurina* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Brassica nigra*, *Centaurea melitensis, Hirschfeldia incana,* and *Leymus condensatus.*

***Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	RHOV	*Rhus ovata*	100	30.0	8.0	55.0	X	X	
	MAFA	*Malacothamnus fasciculatus*	70	1.7	0.2	13.0			
	SAME3	*Salvia mellifera*	60	1.1	1.0	3.0			
	HEAR5	*Heteromeles arbutifolia*	40	2.5	2.5	11.0			
	MALA6	*Malosma laurina*	40	0.6	0.2	5.0			
	ADFA	*Adenostoma fasciculatum*	30	0.9	2.0	4.0			
	KECO	*Keckiella cordifolia*	20	1.9	6.0	13.0			
	CEME	*Ceanothus megacarpus*	20	1.0	5.0	5.0			
	SAME5	*Sambucus mexicana*	20	0.7	0.2	7.0			
	CESP	*Ceanothus spinosus*	20	0.6	1.0	5.0			
	QUBE5	*Quercus berberidifolia*	20	0.4	2.0	2.5			
	CEBE3	*Cercocarpus betuloides*	20	0.3	1.0	2.5			
	ERFA2	*Eriogonum fasciculatum*	20	0.2	0.2	2.0			
	ENCA	*Encelia californica*	20	0.1	0.2	1.0			
Herb									
	BRNI	*Brassica nigra*	40	0.5	0.2	4.0			X
	CEME2	*Centaurea melitensis*	30	0.8	1.0	4.0			X
	HIIN3	*Hirschfeldia incana*	30	0.5	0.2	3.0			X
	LECO12	*Leymus condensatus*	30	0.3	1.0	1.0			
	CAMA24	*Calystegia macrostegia*	20	0.6	1.0	5.0			
	BRDI3	*Bromus diandrus*	20	0.3	1.0	2.0			X
	MASA2	*Malacothrix saxatilis*	20	0.01	0.2	0.2			
	MAMA8	*Marah macrocarpus*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Astragalus brauntonii was found in 1 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-3-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Endangered, and state listing is none (SAMO 2004).

Juglans californica was found in 2 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus madritensis, Marrubium vulgare, Erodium, Melilotus indicus

Samples Used in Description: (n = 10)
AA0126cc, rap0930m, rap1713, rap1871, rap1881, rap2015, rap2381, rap2574, rap2645, rap2729

Comments:
Some of the stands sampled in this association tend to be composed of hybrid backcrosses between *R. ovata* and *R. integrifolia*. However, the majority of physical characteristics of these shrubs appear to have more affinity to *R. ovata* than *R. integrifolia*.

Other stands of the *Rhus ovata* Alliance described from southern California tend to occur in the driy, inland portions of the region. This also appears to be the case in the Santa Monica Mountains area. Most stands of this association are found in the interior of the study area where summer temperatures are relatively hot and summer fog influence is minimal. Colder winter temperatures may also play a role in the distribution of this type by excluding *Malosma laurina*.

Phases:
None

COMMON NAME	Sugar Bush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus ovata* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Other somewhat similar associations have been reported from San Diego and Riverside counties (Keeler-Wolf et al. 1998, Klein and Evens 2005)

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Keeler-Wolf et al. 1998, Klein and Evens 2005

Rhus ovata-Salvia leucophylla-Artemisia californica Shrubland Association

Sugar Bush-Purple Sage-California Sagebrush Shrubland Association
***Rhus ovata* Shrubland Alliance**
Sugar Bush Shrubland Alliance

Mapping Code: 2192

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest- and northeast-facing slopes at low elevations between 265–539 m. It is characterized by a codominance of *Rhus ovata, Salvia leucophylla,* and *Artemisia californica* in the shrub layer. The herbaceous layer often includes *Leymus condensatus.* The emergent tree layer includes occasional *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Dry Inland, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 265–539 m, mean 373 m
Aspect: northwest and northeast
Slope: range 15-–5 degrees, mean 33 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: no data
Small Rock Cover: 30%
Large Rock Cover: no data
Bare Ground: range 15–15%, mean 15%
Parent Material: sedimentary
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Rhus ovata-Salvia leucophylla-Artemisia californica* Shrubland form an intermittent to continuous shrub layer (38–62%, mean 45.5%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–6%, mean 1.7%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 1.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 41–68%, mean cover is 49.4%.

In this association, the shrub layer is characterized by *Rhus ovata, Salvia leucophylla*, *Artemisia californica,* and *Malacothamnus fasciculatus. Heteromeles arbutifolia, Malosma laurina*, *Eriogonum cinereum,* and *Salvia mellifera* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and frequently includes *Leymus condensatus. Centaurea melitensis* is also sometimes present.

***Rhus ovata-Salvia leucophylla-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	23	1.0	2.5	8.0			
	QUAG-T	*Quercus agrifolia*	23	1.0	2.5	7.5			
Shrub									
	RHOV	*Rhus ovata*	100	12.8	6.0	21.0		X	
	SALE3	*Salvia leucophylla*	100	11.6	2.5	24.0		X	
	ARCA11	*Artemisia californica*	92	11.1	1.0	33.0		X	
	MAFA	*Malacothamnus fasciculatus*	92	2.5	0.2	7.5		X	
	HEAR5	*Heteromeles arbutifolia*	54	4.7	2.5	15.0			
	MALA6	*Malosma laurina*	38	0.7	0.2	7.0			
	ERCI5	*Eriogonum cinereum*	31	0.7	0.2	4.0			
	SAME3	*Salvia mellifera*	31	0.5	0.2	3.0			
Herb									
	LECO12	*Leymus condensatus*	62	1.0	0.2	2.5	X		
	CEME2	*Centaurea melitensis*	23	0.6	0.2	5.0			X

Other Noteworthy Species:
Juglans californica was found in 4 of 13 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Silybum marianum

Samples Used in Description: (n = 13)
AA0083cc, AA0104cc, AA0113cc, AA0384cc, AA1093, rap1578, rap1945, rap2085, rap2126, rap2132, rap2273, rap2511, rap2839

Comments:
As with the other association of the *Rhus ovata* Alliance, this association occurs in the more inland portions of the Santa Monica Mountians study area. This type may predominate in areas that experience relatively severe winter frosts. Stands of this association differ from the previous association in having a shorter shrub layer of *Artemisia californica* and *Salvia leucophylla* that codominates with the taller and broader evergreen *Rhus ovata*. As with the previous type, *R. ovata* individuals in these stands also occasionally have characteristics morphologically intermediate between *R. ovata* and *R. integrifolia*.

Phases:
None

COMMON NAME	Sugar Bush-Purple Sage-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus ovata* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salix exigua Shrubland Alliance

Narrow Leaf Willow Shrubland Alliance

Mapping Code: 3110

Local Description

Summary:
This shrubland alliance usually occurs on flat or gentle sloping surfaces with little or no exposure at low elevations between 1 and 10 m. It is dominated by *Salix exigua* in the shrub layer. Other *Salix* species may be present at low cover including *S. lasiolepis.* The herbaceous layer is diverse and includes *Typha* sp., *Arundo donax*, *Melilotus albus*, and *Rorippa nasturtium-aquaticum* at low cover.

Distribution:
This alliance is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 1–10 m, mean 5.5 m
Aspect: none (flat)
Slope: range 0–2 degrees, mean 1.0 degrees
Topography (micro; macro): concave or flat; bottom
Litter Cover: no data
Small Rock Cover: range 0–20%, mean 10.0%
Large Rock Cover: range 0–10%, mean 5.0%
Bare Ground: range 60–80%, mean 70.0%
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
Stands of the *Salix exigua* Shrubland Alliance form an open shrub layer (6–11%, mean 8.5%) at 0–2 m tall, an open tree layer (<0.2%) with hardwoods at 0–5 m tall, and an open herbaceous layer (4–5%, mean 4.5%) at 1–2 m tall. Total vegetation cover is 10–15%, mean cover is 12.5%.

In this alliance, the shrub layer is dominated by *Salix exigua*. Other *Salix* species may be present at relatively low cover including *S. lasiolepis.* The herbaceous layer is diverse and includes *Typha* sp., *Arundo donax*, *Melilotus albus*, and *Rorippa nasturtium-aquaticum* at low cover.

***Salix exigua* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAEX	*Salix exigua*	100	5.5	3.0	8.0	X	X	
	SALIX-M	*Salix*	50	1.5	3.0	3.0			
	SALA6-M	*Salix lasiolepis*	50	1.5	3.0	3.0			
Herb									
	TYPHA	*Typha*	100	2.0	1.0	3.0		X	
	ARDO4	*Arundo donax*	100	1.0	1.0	1.0		X	X
	MEAL2	*Melilotus albus*	100	0.6	0.2	1.0		X	X
	RONA2	*Rorippa nasturtium-aquaticum*	100	0.6	0.2	1.0		X	X
	ALGAE	Algae	100	0.2	0.2	0.2		X	
	HIIN3	*Hirschfeldia incana*	50	0.5	1.0	1.0			X
	UNGR	Unknown annual grass	50	0.5	1.0	1.0			
	BRNI	*Brassica nigra*	50	0.1	0.2	0.2			X
	CHGL	*Chaenactis glabriuscula*	50	0.1	0.2	0.2			
	HEGR7	*Heterotheca grandiflora*	50	0.1	0.2	0.2			
	JUNCU	*Juncus*	50	0.1	0.2	0.2			
	LEMNA	*Lemna*	50	0.1	0.2	0.2			
	LUSU3	*Lupinus succulentus*	50	0.1	0.2	0.2			
	POMO5	*Polypogon monspeliensis*	50	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	50	0.1	0.2	0.2			X
	SATR12	*Salsola tragus*	50	0.1	0.2	0.2			X
	SCIRP	*Scirpus*	50	0.1	0.2	0.2			
	SCAM2	*Scirpus americanus*	50	0.1	0.2	0.2			
	SONCH	*Sonchus*	50	0.1	0.2	0.2			X
	VEAN2	*Veronica anagallis-aquatica*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Arundo donax, Melilotus albus, Rorippa nasturtium-aquaticum, Hirschfeldia incana, Brassica nigra, Polypogon monspeliensis, Rumex crispus, Salsola tragus, Sonchus, Veronica anagallis-aquatica

Samples Used in Description: (n = 2)
rap1127, rap1753

Comments:
This alliance is sparingly represented in the Santa Monica Mountains by small stands along permanent or intermittent streams. Most stands are small (< 0.5 ha).

Phases:
None

COMMON NAME Narrow Leaf Willow Alliance
SYNONYM Sandbar Willow, Coyote Willow

PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION	III.B.2.N.d. Temporarily flooded cold-deciduous shrubland
ALLIANCE	*Salix exigua* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5 (alliance)

Global Description

Distribution:
This alliance is widely known from much of North America. The related *Salix exigua* seasonally flooded woodland *a*lliance is only known from Texas and is considered a woodland, not a shrubland.

Nations:
United States, Canada

States or Provinces:
USA: AR, AZ, CA, CO, IA, ID, IL, IN, KS, KY?, MT, ND, NE, NM, NV, OH?, OK, OR, PA?, SD, TN?, TX, UT, WA, WY
CAN: MB, ON

Environmental Description:
Plant associations within this alliance are located on floodplains and gravel bars at an elevation range between 780 and 1,760 m in the West and at lower elevations (to below 100 m) in the midwestern and southeastern United States. These shrublands are found on open sandbars without canopy shading on larger, well-developed drainages and along larger sandy rivers or on coarser-textured substrates. They are associated with annual flooding and inundation and will grow well into the channel, where it is flooded, even in drier years. Even though flooding is frequent, surface water is not present for much of the growing season and the water table is well below the surface. Some stands form large, wide stands on midchannel islands on larger rivers or narrow stringer bands on small, rocky tributaries. Stream reaches range widely from moderately sinuous and moderate-gradient reaches to broad, meandering rivers with wide floodplains or broad, braided channels. Many stands also occur within highly entrenched or eroding gullies.

This alliance represents an early seral primary successional stage on newly deposited sediments that may persist under a regime of repeated fluvial disturbance. *Salix exigua* and *Salix interior* are highly adapted to most forms of disturbance. Both species are prolific sprouters and will reestablish themselves on sites dominated by other disturbance-associated species, for example, *Glycyrrhiza lepidota* and *Pascopyrum smithii*.

Vegetation Description:
Plant associations within this alliance are characterized as temporarily flooded cold-deciduous shrubland dominated by *Salix exigua* or *Salix interior*. The tall shrub layer has 15–90% cover, ranging in height between 2–5 m. Other willows can occur in the canopy including *Salix eriocephala, Salix lutea, Salix ligulifolia,* and *Salix monticola*. Occasionally the taller *Salix amygdaloides* or *Populus deltoides* occur within the tree subcanopy. The herbaceous layer varies greatly over the broad range of the alliance. It has at least 20–35% cover of various graminoid species including *Carex nebrascensis, Carex pellita (Carex lanuginosa), Spartina pectinata, Phalaris arundinacea, Equisetum arvense, Panicum bulbosum*, and *Muhlenbergia rigens.* The forb cover is usually sparse. The understory can be dominated by barren ground or gravel bar. In Oklahoma, some associates can include *Cephalanthus occidentalis, Eupatorium serotinum, Panicum virgatum, Parthenocissus quinquefolia, Pluchea odorata, Tamarix chinensis*, and *Vitis acerifolia* (Hoagland 2000).

Comments:
All stands of this alliance seen in California are shrublands, though they may be taller than 5 m.

References:
Hoagland 2000, NatureServe 2005, Sawyer and Keeler-Wolf 1995, Vaghti 2003

Salvia leucophylla Shrubland Association

Purple Sage Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3316

Local Description

Summary:
This shrubland association occurs on gentle to very steep slopes of variable aspect at low elevations between 18–613 m. It is characterized by a strong dominance of *Salvia leucophylla* in the shrub layer. The herbaceous layer is composed of both native and nonnative grasses and herbs. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 18–613 m, mean 331 m
Aspect: variable
Slope: range 2–50 degrees, mean 25.5 degrees
Topography (micro; macro): convex, undulating, flat, or concave; bottom to ridgetop
Litter Cover: range 15–75%, mean 33.6%
Small Rock Cover: range 0–60%, mean 13.6%
Large Rock Cover: range 0–8%, mean 0.7%
Bare Ground: range 10–90%, mean 37.4%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Salvia leucophylla* Shrubland form an open to intermittent shrub layer (12–60%, mean 35.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–43%, mean 6.6%) at 0–2 m tall. Trees are occasionally emergent (0–9% cover, mean 0.8%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 23–65%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Salvia leucophylla* and *Artemisia californica. Malacothamnus fasciculatus* is often included in this layer. Other shrubs sometimes found include *Malosma laurina, Sambucus mexicana, Baccharis pilularis*, *Hazardia squarrosa, Rhus ovata,* and *Eriogonum cinereum*. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus,* and *Centaurea melitensis.*

***Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	100	25.2	9.0	55.0		X	
	ARCA11	*Artemisia californica*	91	3.5	0.2	9.0		X	
	MAFA	*Malacothamnus fasciculatus*	54	1.9	0.2	10.0			
	MALA6	*Malosma laurina*	42	0.9	0.2	7.0			
	SAME5	*Sambucus mexicana*	32	0.6	0.2	12.0			
	BAPI	*Baccharis pilularis*	29	0.5	0.2	5.0			
	HASQ2	*Hazardia squarrosa*	27	0.4	0.2	10.0			
	RHOV	*Rhus ovata*	23	0.4	0.2	9.0			
Herb									
	BRNI	*Brassica nigra*	47	0.9	0.2	15.0			X
	LECO12	*Leymus condensatus*	41	2.2	0.2	43.0			
	CEME2	*Centaurea melitensis*	26	0.6	0.2	7.5			X
	HIIN3	*Hirschfeldia incana*	21	0.3	0.2	10.0			X

Other Noteworthy Species:
Astragalus brauntonii was found in 1 of 78 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-3-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Endangered, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 3 of 78 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 16 of 78 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus madritensis, Melilotus indicus, Avena fatua, Avena, Carduus pycnocephalus, Foeniculum vulgare, Nicotiana glauca, Melilotus officinalis, Eucalyptus, Silybum marianum, Bromus hordeaceus, Conium maculatum, Avena barbata, Bromus madritensis subsp. *rubens, Phalaris aquatica, Erodium, Erodium cicutarium, Galium aparine, Lactuca serriola, Piptatherum miliaceum, Ricinus communis*

Samples Used in Description: (n = 78)
AA0100cc, AA0107cc, AA0112cc, AA0125cc, AA0164cc, AA0319cc, AA0380cc, AA0428, AA0444cc, AA0467cc, AA0535, AA0537, AA0542, AA0566, AA0569, AA0576, AA0607, AA0686, AA0710, AA0816, AA0842, AA0843, AA0891, AA0950, AA0979, AA0987, AA1075, AA1101, AA1108, AA1116, AA1163, AA1216, AA1223, rap0920, rap0936, rap0939, rap0958, rap0998, rap1231, rap1298m, rap1308, rap1393, rap1403, rap1430, rap1501, rap1526, rap1529, rap1532, rap1556, rap1559, rap1570, rap1582, rap1673, rap1834, rap1844, rap1860, rap1885m, rap1893, rap1901m, rap1939, rap1941, rap1951, rap1997m, rap2009m, rap2021, rap2029, rap2086, rap2159, rap2294, rap2380, rap2397, rap2415m, rap2416, rap2434, rap2467rlv, rap2512, rap2591, rap2842

Comments:
This is a characteristic and common alliance of the coastal sage scrub in the Santa Monica Mountains study area. It is clearly related to other alliances, particularly the *Artemisia californica* Alliance. However, as shown in a Bray-Curtis ordination (McCune and Grace 2002), samples of the full array of stands dominated or codominated by *Artemisia californica* and/or *Salvia leucophylla* tend to segregate from stands dominated by *Artemisia,* while stands dominated by *S. leucophylla* or codominated by *S. leucophylla* and *A. californica* share the same ordination space. This suggests that any stand with either pure *S. leucophylla* or more or less equal mixes of the two shrubs should be considered in the *S. leucophylla* Alliance. As indicated by the list of phases, there is substantial variation in this association. Phases tend to represent seral stage (e.g., higher cover of short-lived perennials, such as *Malacothamnus fasciculatus*, or higher cover of perennial grasses that respond to burning such as *Leymus condensatus*). The presence of *Nassella* spp. in some stands may indicate a specific moisture regime coupled with soil texture (finer-grained clay-rich soils) that has yet to be fully defined. Further identification at the species level may indicate that most of the *Nassella* species are *Nassella lepida*, a common understory to more coastal (fog zone) stands of coastal sage scrub.

Phases:
Salvia leucophylla-Artemisia californica Malacothamnus fasciculatus (Purple Sage-California Sagebrush-Bush Mallow) Phase [8311]
Salvia leucophylla-Artemisia californica (Purple Sage-California Sagebrush) Phase [3316]
Salvia leucophylla/Leymus condensatus (Purple Sage/Giant Wild Rye) Phase [3319]
Salvia leucophylla/Nassella spp. (Purple Sage/Needlegrass) Phase [3311]

COMMON NAME	Purple Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Borchert et al. 2004 in their work on the Los Padres National Forest of Santa Barbara and Ventura counties north to Monterey County describe stands of *S. leucophylla* Alliance (reinterpreted by Sawyer et al. 2006) that most likely match this local association.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Borchert et al. 2004

Salvia leucophylla-Artemisia californica Shrubland Association

Purple Sage-California Sagebrush Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3391

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep northwest- and northeast-facing slopes at low elevations between 24–472 m. It is characterized by a codominance of *Artemisia californica* and *Salvia leucophylla* in the shrub layer with no distinguishing species in the herbaceous layer. The emergent tree layer is generally absent but can include *Quercus agrifolia, Q. lobata*, or *Juglans californica*.

Distribution:
This association is sampled in the Dry Inland, Simi Hills Inland, Immediate Coast, Western Fog Zone, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 24–472 m, mean 289.5 m
Aspect: northwest and northeast
Slope: range 10–46 degrees, mean 28.8 degrees
Topography (micro; macro): undulating, flat, concave, or convex; lower to upper slope
Litter Cover: range 15–45%, mean 28.9%
Small Rock Cover: range 1–57%, mean 15.2%
Large Rock Cover: range 0–10%, mean 1.2%
Bare Ground: range 2–65%, mean 33.9%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Salvia leucophylla-Artemisia californica* Shrubland form an open to intermittent shrub layer (13–52%, mean 35.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–29%, mean 6.3%) at 0–2 m tall. Trees are occasionally emergent (0–15% cover, mean 1.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 24–65%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Salvia leucophylla* and *Artemisia californica. Malosma laurina, Malacothamnus fasciculatus,* and *Sambucus mexicana* are occasionally included in this layer. The tree layer is emergent and open and rarely includes *Quercus agrifolia, Juglans californica, and Quercus lobata* at low cover. The herbaceous layer is diverse and often includes *Leymus condensatus. Brassica nigra, Centaurea melitensis,* and *Bromus diandrus* are occasionally present in this layer.

***Salvia leucophylla-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	100	15.4	2.0	27.0		X	
	ARCA11	*Artemisia californica*	100	14.7	1.0	28.0		X	
	ALA6	*Malosma laurina*	39	1.1	0.2	10.0			
	MAFA	*Malacothamnus fasciculatus*	34	0.6	0.2	7.5			
	SAME5	*Sambucus mexicana*	27	0.3	0.2	7.0			
	RHOV	*Rhus ovata*	25	0.5	0.2	7.5			
	BAPI	*Baccharis pilularis*	25	0.5	0.2	7.5			
	HASQ2	*Hazardia squarrosa*	24	0.5	0.2	6.0			
	ERCI5	*Eriogonum cinereum*	24	0.5	0.2	4.0			
	YUWH	*Yucca whipplei*	23	0.4	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.3	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	52	2.4	0.2	27.0			
	BRNI	*Brassica nigra*	28	0.3	0.2	6.0			X
	CEME2	*Centaurea melitensis*	20	0.5	0.2	12.0			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 6 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Stanleya pinnata was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus diandrus, Hirschfeldia incana, Bromus madritensis, Melilotus indicus, Avena fatua, Carduus pycnocephalus, Nicotiana glauca, Anagallis arvensis, Galium aparine, Schinus molle, Brassica, Erodium, Erodium cicutarium, Marrubium vulgare, Schinus molle, Senecio vulgaris, Silybum marianum, Sonchus

Samples Used in Description: (n = 79)
AA0017cc, AA0103cc, AA0106cc, AA0110cc, AA0173cc, AA0223cc, AA0238cc, AA0250cc, AA0256cc, AA0263cc, AA0317cc, AA0339, AA0364cc, AA0390cc, AA0398cc, AA0446cc, AA0447cc, AA0448cc, AA0466cc, AA0505, AA0526, AA0531, AA0538, AA0544, AA0545cc, AA0628, AA0677, AA0682, AA0732, AA0739cc, AA0746cc, AA0760, AA0761, AA0764, AA0791, AA0801, AA0821, AA0900, AA1060, AA1200, AA1225, rap0062, rap0103, rap0164, rap0679, rap0682, rap0992, rap1151, rap1154, rap1280, rap1310, rap1315, rap1318, rap1322, rap1324, rap1342, rap1386, rap1390, rap1397, rap1435m, rap1436m, rap1437m, rap1440m, rap1448, rap1515, rap1827, rap1892, rap1923, rap2122, rap2130, rap2198, rap2303, rap2472rlv, rap2573, rap2581, rap2737, rap2840, rap2868rlv, rap2881rlv

Comments:
This is an abundant and characteristic association within the study area. It has a range of expressions from intermittent to open cover and includes a variety of species that may be occasionally present. Either *Artemisia californica* or *Salvia leucophylla* may be more than twice the cover of the other species. Two phases exist based on these variations.

Phases:
Salvia leucophylla-Artemisia californica (California Sagebrush-Purple Sage codominance) Phase [3391]
Salvia leucophylla-Artemisia californica/Leymus condensatus (California Sagebrush-Purple Sage/Giant Wild Rye) Phase [3393]

COMMON NAME	Purple Sage-California Sagebrush Shrubland Association
SYNONYM	Purple Sage-California Sagebrush (Kirkpatrick and Hutchinson 1977), Ventura Coastal Sage Scrub (Holland 1986)
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association has been described from the Santa Monica Mountains and the northwestern peninsular ranges of Orange County (Gordon and White 1994). It is likely to occur farther north as far as San Luis Obispo County, but information about its global distribution is not available without additional inventory. In Los Padres National Forest, Borchert et al. 2004 have an analogous codominant vegetation type, which they interpret at the alliance level.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Although this is a very common association in the study area, its range is probably largely limited to the region between coastal Los Angeles and coastal San Luis Obispo counties. A similar association was described by Kirkpatrick and Hutchinson 1977. However, their definition was somewhat broader than this one.

References:
Borchert et al. 2004, Gordon and White 1994, Holland 1986, Kirkpatrick and Hutchinson 1977

Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella spp. Shrubland Association

Purple Sage-California Sagebrush-Ashy Buckwheat/Needlegrass Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3396

Local Description

Summary:
This shrubland association occurs on gentle to steep northwest- and northeast-facing slopes at low elevations between 9–457 m. It is characterized by a codominance of *Artemisia californica* and *Salvia leucophylla* with a subdominance of *Eriogonum cinereum* in the shrub layer and a low cover of native grasses such as *Nassella lepida, Nassella* sp., and *Leymus condensatus* in the herbaceous layer. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 9–457 m, mean 198.7 m
Aspect: Variable, most often northwest and northeast
Slope: range 2–45 degrees, mean 22.5 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridgetop
Litter Cover: range 0–85%, mean 37.2%
Small Rock Cover: range 0–50%, mean 13.2%
Large Rock Cover: range 0–15%, mean 0.9%
Bare Ground: range 5–75%, mean 31%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine sandy clay loam to fine clay

Vegetation Description:
Stands of *Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella* spp. Shrubland form an open to intermittent shrub layer (9–59%, mean 32.2%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–65%, mean 13.9%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 16–90%, mean cover is 45.3%.

In this association, the shrub layer is characterized by *Artemisia californica, Salvia leucophylla,* and *Eriogonum cinereum. Malosma laurina*, *Hazardia squarrosa,* and *Lotus scoparius* are often included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and usually includes *Leymus condensatus,* while *Nassella lepida* and *Bromus madritensis* are sometimes present.

***Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella* spp. Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	9.0	0.2	28.0		X	
	SALE3	*Salvia leucophylla*	97	9.2	0.2	35.0		X	
	ERCI5	*Eriogonum cinereum*	90	4.2	0.2	15.0		X	
	MALA6	*Malosma laurina*	69	3.0	0.2	15.0			
	HASQ2	*Hazardia squarrosa*	52	1.0	0.2	13.0			
	LOSC2	*Lotus scoparius*	43	0.4	0.2	9.0			
	RHIN2	*Rhus integrifolia*	40	0.7	0.2	6.0			
	YUWH	*Yucca whipplei*	40	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	34	1.3	0.2	26.0			
	MAFA	*Malacothamnus fasciculatus*	31	0.6	0.2	6.0			
	ENCA	*Encelia californica*	30	0.7	0.2	8.0			
	ERCO25	*Eriophyllum confertiflorum*	22	0.1	0.2	2.0			
Herb									
	LECO12	*Leymus condensatus*	57	1.1	0.2	10.0			
	NALE2	*Nassella lepida*	36	3.0	0.2	35.0			
	BRMA3	*Bromus madritensis*	34	0.5	0.2	10.0			X
	BRNI	*Brassica nigra*	34	0.2	0.2	2.5			X
	NASSE	*Nassella*	27	2.8	0.2	25.0			
	CEME2	*Centaurea melitensis*	26	0.8	0.2	12.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 5 of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Brassica nigra, Centaurea melitensis, Erodium cicutarium, Bromus hordeaceus, Bromus diandrus, Avena, Phalaris aquatica, Hirschfeldia incana, Anagallis arvensis, Avena fatua, Melilotus indicus, Erodium, Sonchus oleraceus, Carduus pycnocephalus, Galium aparine, Medicago polymorpha, Senecio vulgaris, Avena barbata, Sonchus, Bromus madritensis subsp. *rubens, Lolium, Bromus tectorum, Cirsium vulgare, Foeniculum vulgare, Lactuca serriola, Marrubium vulgare, Oxalis pes-caprae, Silene gallica, Silybum marianum*

Samples Used in Description: (n = 77)
AA0011cc, AA0184cc, AA0218cc, AA0482cc, AA0533, AA0911, AA0961, AA0996, AA1061, AA1178, rap0054, rap0071, rap0078, rap0079, rap0086, rap0089, rap0102, rap0168, rap0174, rap0177, rap0189, rap0190, rap0191, rap0194, rap0213, rap0482, rap0521, rap0655, rap0675, rap0684, rap0846, rap0918, rap0921, rap0937m, rap0988, rap0990, rap0991, rap1050, rap1058, rap1077m, rap1104, rap1248, rap1251, rap1253, rap1398, rap1419, rap1473, rap1475, rap1510, rap1564, rap1799, rap1802, rap1805, rap1806, rap1891, rap1918, rap2018m, rap2270, rap2298, rap2300, rap2468rlv, rap2470rlv, rap2471rlv, rap2539rlv, rap2550, rap2558rlv, rap2559rlv,

rap2697, rap2762, rap2865rlv, rap2866rlv, rap2867rlv, rap2876rlv, rap2880rlv, rap2896rlv, rap2906rlv, rap2930

Comments:
Although similar to the *S. leucophylla-A. californica* Association of the same alliance, this association has a constant and significant cover of *Eriogonum cinereum*. This shrub is largely endemic to the greater Santa Monica Mountains area and tends to denote steep slopes within the coastal fog zone. Several phases have been identified depending on the relative cover and constancy of other associated shrubs. Although *Nassella lepida* appears to be the most common associated grass, some samples were taken when the species of *Nassella* was not positively identified—hence the addition of *Nassella* sp. in the species list. Postfire stands tend to have a relative increase in grasses and short-lived perennial shrubs such as *Nassella* spp. and *Hazardia squarrosa* or *Malacothamnus fasciculatus.* The coastal influence and steep slopes of this association are also underscored by the presence of *Rhus integrifolia* in 40% of the stands sampled. Additional phases have been identified with relatively higher cover and frequency of *Malosma laurina* and based on the addition of *Mimulus aurantiacus* to the constant mixture of the other species.

Phases:
Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella spp. (California Sagebrush-Purple Sage-Ashy Buckwheat/Needlegrass) Phase [3396]
Salvia leucophylla-Artemisia californica-Malosma laurina/Nassella spp. (California Sagebrush-Purple Sage-Laurel Sumac/Needlegrass) Phase [3395]
Salvia leucophylla-Artemisia californica-Mimulus aurantiacus (California Sagebrush-Purple Sage-Bush Monkey Flower) Phase [3392]

COMMON NAME	Purple Sage-California Sagebrush-Ashy Buckwheat/Needlegrass Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. In the Los Padres National Forest, Borchert et al. 2004 have an analogous codominant alliance, reinterpreted by Sawyer et al. 2006.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The range of *Eriogonum cinereum* extends from Los Angeles to Santa Barbara counties with its center of distribution in the Santa Monica Mountains.

References:
Borchert et al. 2004, Sawyer et al. 2006

Salvia leucophylla-Eriogonum cinereum/Annual Grass-Herb Shrubland Association

Purple Sage-Ashy Buckwheat/Annual Grass-Herb Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3312

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 0–494 m. It is characterized by dominance to codominance of *Salvia leucophylla* with subdominance to codominance of *Eriogonum cinereum* in the shrub layer.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–494 m, mean 272.4 m
Aspect: southeast and southwest
Slope: range 15–38 degrees, mean 27.7 degrees
Topography (micro; macro): undulating or convex; lower slope to ridgetop
Litter Cover: range 15–45%, mean 26.7%
Small Rock Cover: range 5–50%, mean 19.7%
Large Rock Cover: range 0–2%, mean 0.2%
Bare Ground: range 15–62%, mean 38.7%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Salvia leucophylla-Eriogonum cinereum/*Annual Grass-Herb Shrubland form an open to intermittent shrub layer (20–48%, mean 32.6%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 1–2 m tall. The herbaceous layer is open (0–23%, mean 6.9%) at 0–1 m tall. Trees are not present. Total vegetation cover is 30–55%, mean cover is 39.3%.

In this association, the shrub layer is characterized by *Eriogonum cinereum, Salvia leucophylla,* and *Artemisia californica*. *Yucca whipplei* and *Encelia californica* are often included in this layer. The tree layer is absent. The herbaceous layer is simple and often includes *Brassica nigra* and *Leymus condensatus.* Other herbs sometimes present include *Centaurea melitensis, Hirschfeldia incana, Bromus madritensis,* and *Bromus diandrus.*

***Salvia leucophylla-Eriogonum cinereum/Annual Grass-Herb* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	100	17.9	6.0	36.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	7.0	2.0	14.0		X	
	ARCA11	*Artemisia californica*	86	1.5	0.2	4.0		X	
	YUWH	*Yucca whipplei*	57	0.3	0.2	1.0			
	ENCA	*Encelia californica*	50	2.2	0.2	15.0			
	MAFA	*Malacothamnus fasciculatus*	43	0.3	0.2	2.0			
	HASQ2	*Hazardia squarrosa*	36	0.6	0.2	6.0			
	LOSC2	*Lotus scoparius*	29	0.7	0.2	9.0			
	MALA6	*Malosma laurina*	29	0.1	0.2	0.2			
Herb									
	BRNI	*Brassica nigra*	64	2.1	0.2	10.0			X
	LECO12	*Leymus condensatus*	50	0.4	0.2	3.0			
	NASSE	*Nassella*	36	1.0	0.2	12.0			
	CEME2	*Centaurea melitensis*	29	0.4	0.2	2.0			X
	HIIN3	*Hirschfeldia incana*	29	0.4	0.2	3.0			X
	BRMA3	*Bromus madritensis*	29	0.1	0.2	1.0			X
	BRDI3	*Bromus diandrus*	21	1.6	3.0	15.0			X
	CUCA	*Cuscuta californica*	21	0.1	0.2	1.0			

Other Noteworthy Species:
None

Nonnative Species:
Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Bromus diandrus, Avena, Melilotus indicus, Erodium cicutarium, Foeniculum vulgare, Anagallis arvensis, Avena fatua, Brassica, Erodium, Sonchus oleraceus

Samples Used in Description: (n = 14)
AA1158, rap0057, rap0099, rap0100, rap0113, rap0902, rap1320, rap1449, rap1746, rap1926, rap2020, rap2877rlv, rap2878rlv, rap2879rlv

Comments:
This association is likely to be endemic to the western transverse ranges at relatively low elevations. It has some relationships with the *Eriogonum cinereum* Alliance but tends to occur on less steep slopes, while that alliance tends to have a very low cover of *Salvia leucophylla* in only about 30% of the stands.

Phases:
None

COMMON NAME	Purple Sage-Ashy Buckwheat/Annual Grass-Herb Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural

FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salvia mellifera Shrubland Association

Black Sage Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 3324

Local Description

Summary:
This shrubland association occurs on moderate to very steep southeast- and southwest-facing slopes at low elevations between 20–768 m. It is characterized by a strong dominance of *Salvia mellifera* in the shrub layer. The herbaceous layer is generally insignificant, as is the emergent tree layer.

Distribution:
This association is sampled in the Dry Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, Simi Hills Inland, Eastern Urban, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 20–768 m, mean 332.8 m
Aspect: southeast and southwest
Slope: range 10–46 degrees, mean 29.4 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 15–70%, mean 34.1%
Small Rock Cover: range 0–40%, mean 18.1%
Large Rock Cover: range 0–25%, mean 2%
Bare Ground: range 0–55%, mean 32.9%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Salvia mellifera* Shrubland form an open to intermittent shrub layer (21–55%, mean 36.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–19%, mean 2.2%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 21–55%, mean cover is 38.7%.

In this association, the shrub layer is characterized by abundant *Salvia mellifera. Yucca whipplei*, *Adenostoma fasciculatum,* and *Artemisia californica* are often included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica, Quercus agrifolia,* and *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis*, *Centaurea melitensis,* and *Brassica nigra*. Other herbs present may include *Hirschfeldia incana, Leymus condensatus, Melica imperfecta,* and *Nassella lepida*.

***Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	25.0	10.0	51.0	X		
	YUWH	*Yucca whipplei*	58	0.7	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	56	1.8	0.2	11.0			
	ARCA11	*Artemisia californica*	54	1.0	0.2	7.5			
	MAFA	*Malacothamnus fasciculatus*	46	1.5	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	46	0.9	0.2	6.0			
	MALA6	*Malosma laurina*	46	0.7	0.2	8.0			
	ENCA	*Encelia californica*	36	0.7	0.2	7.5			
	RHOV	*Rhus ovata*	29	0.4	0.2	7.5			
	CEME	*Ceanothus megacarpus*	28	0.6	0.2	5.0			
	LOSC2	*Lotus scoparius*	25	0.1	0.2	3.0			
	ERCI5	*Eriogonum cinereum*	24	0.5	0.2	7.5			
	SALE3	*Salvia leucophylla*	24	0.2	0.2	2.5			
	HEAR5	*Heteromeles arbutifolia*	22	0.3	0.2	7.0			
Herb									
	BRMA3	*Bromus madritensis*	26	0.2	0.2	4.0			X
	CEME2	*Centaurea melitensis*	25	0.2	0.2	3.0			X
	BRNI	*Brassica nigra*	22	0.2	0.2	2.5			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 72 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 6 of 72 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Avena, Foeniculum vulgare, Marrubium vulgare, Avena fatua, Carduus pycnocephalus, Erodium cicutarium, Nicotiana glauca, Schinus molle, Avena barbata, Erodium, Eucalyptus, Malva parviflora, Medicago polymorpha, Melilotus indicus, Rumex crispus, Schinus molle, Spartium junceum

Samples Used in Description: (n = 72)
AA0088cc, AA0105cc, AA0114cc, AA0128cc, AA0162cc, AA0265cc, AA0328cc, AA0469cc, AA0528, AA0610, AA0765, AA0852, AA0920, AA0982, AA0989, AA1008, AA1068, AA1085, AA1086, AA1089, AA1100, AA1115, AA1124, AA1208, rap0138, rap0529m, rap0539, rap0571, rap0704, rap0717, rap0722, rap0808m, rap0895, rap0948, rap0969, rap1216, rap1266, rap1388, rap1392, rap1459, rap1522, rap1527, rap1560, rap1563, rap1660m, rap1661m, rap1665, rap1667m, rap1724, rap1822, rap1839, rap1840, rap1854, rap1862, rap1898, rap1906, rap1933m, rap1966, rap1976, rap1998m, rap2052, rap2053, rap2105, rap2114, rap2123, rap2262, rap2286, rap2292m, rap2349, rap2466rlv, rap2841, rap2883rlv

Comments:
This is a common association in the study area. It is physiognomically part of the coastal sage scrub vegetation formation, but ecologically, *Salvia mellifera* is often associated with certain chaparrals such as *Adenostoma fasciculatum* and *Adenostoma fasciculatum-Salvia mellifera* alliances. *S. mellifera* is more completely drought deciduous than some other species of the coastal sage scrub, and this may enable it to tolerate extremely hot and dry exposures often found in the xeric chaparrals. The phases identified in this association reflect a pure form with monospecific dominance, a postfire form with bush mallow, a mixed xeric scrub with California buckwheat, and a transition to more of chaparral vegetation.

Phases:
Salvia mellifera-Malacothamnus fasciculatus (Black Sage-Bush Mallow) Phase [3322]
Salvia mellifera-Eriogonum fasciculatum (Black Sage-California Buckwheat) Phase [3321]
Salvia mellifera (Black Sage) Phase [3324]
Salvia mellifera-Adenostoma fasciculatum (Black Sage-Chamise) Phase [3329]

COMMON NAME	Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and other portions of the western transverse ranges (Malanson 1984) and probably in coastal ranges of California from the central portion of the state (Evens and San 2004) to at least the Mexican border. It is likely that some of the stands sampled by Borchert et al. 2004 on the Los Padres National Forest of Ventura, Santa Barbara, and San Luis Obispo counties can be placed in this association. This association has also been described from San Diego County and Orange County (Desimone and Burk 1992) and may occur as far north as Contra Costa County (Ertter and Bowerman 2002).

Nations:
United States

States or Provinces:
CA

Environmental Description:
Information from Borchert et al. 2004, Klein and Evens 2005, and Evens and San 2005 suggests that the elevation range of this association extends upward to 1,050 m in places like Riverside

County, apparently in drier and more inland south coastal areas with aspect tending to face more northeast than in the Santa Monica Mountains (Klein and Evens 2005).

Vegetation Description:
Based on the description of this association from Riverside County (Klein and Evens 2005) and San Diego County (Evens and San 2005), we can add the following information:
Salvia mellifera is usually the dominant shrub in the overstory. *Eriogonum fasciculatum* is consistently present, usually as a subdominant shrub. A variety of other coastal sage and chaparral species frequently intermix in the shrub layer as subdominants. Some of these species include *Artemisia californica*, *Ceanothus crassifolius*, *Adenostoma fasciculatum*, *Keckiella antirrhinoides*, and *Encelia farinosa*. The understory herbaceous layer consists of native species, such as *Leymus condensatus* and *Nassella lepida,* and nonnative species such as *Bromus madritensis* and *Centaurea melitensis*.

Comments:
See local description.

References:
Borchert et al. 2004, Desimone and Burk 1992, Ertter and Bowerman 2002, Evens and San 2004, Evens and San 2005, Klein and Evens 2005, Malanson 1984

Salvia mellifera-Eriogonum cinereum Shrubland Association

Black Sage-Ashy Buckwheat Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 3323

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southwest-facing slopes at low elevations between 0–507 m. It is characterized by a dominance of *Salvia mellifera* and a subdominance of *Eriogonum cinereum* in the shrub layer. Herbs and trees are insignificant in this association.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–507 m, mean 186.9 m
Aspect: southwest
Slope: range 15–40 degrees, mean 32.8 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: range 15–20%, mean 17.5%
Small Rock Cover: range 5–40%, mean 16.6%
Large Rock Cover: range 0–10%, mean 2.1%
Bare Ground: range 10–70%, mean 39.6%
Parent Material: igneous
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Salvia mellifera-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (21–45%, mean 33.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–9%, mean 1.6%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–50%, mean cover is 35.9%.

In this association, the shrub layer is characterized by *Salvia mellifera, Eriogonum cinereum*, *Malosma laurina,* and *Yucca whipplei*. *Rhus ovata* and *Encelia californica* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis* and *Leymus condensatus.* Other herbs may include *Calystegia macrostegia*, *Hirschfeldia incana*, *Bromus madritensis,* and *Cuscuta californica*.

***Salvia mellifera-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	17.0	6.0	33.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	7.5	2.0	12.0		X	
	MALA6	*Malosma laurina*	75	1.8	0.2	6.0		X	
	YUWH	*Yucca whipplei*	75	0.9	0.2	5.0		X	
	RHOV	*Rhus ovata*	60	1.5	0.2	6.0			
	ENCA	*Encelia californica*	50	1.7	1.0	10.0			
	ARCA11	*Artemisia californica*	45	0.8	0.2	4.0			
	SALE3	*Salvia leucophylla*	30	0.4	0.2	5.0			
	LOSC2	*Lotus scoparius*	30	0.1	0.2	0.2			
	CEME	*Ceanothus megacarpus*	25	0.3	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	25	0.2	0.2	1.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.1	0.2	0.2			
	CEBE3	*Cercocarpus betuloides*	20	0.4	0.2	6.0			
	RHIN2	*Rhus integrifolia*	20	0.4	0.2	4.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.1	0.2	1.0			
Herb									
	CEME2	*Centaurea melitensis*	30	0.9	0.2	8.0			X
	LECO12	*Leymus condensatus*	25	0.2	0.2	1.0			

Other Noteworthy Species:
Erysimum insulare was found in 1 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Avena, Hirschfeldia incana, Pennisetum setaceum, Bromus madritensis, Spartium junceum, Avena fatua, Brassica nigra

Samples Used in Description: (n = 20)
AA0326cc, AA0778, AA0828, AA0959, rap0016m, rap0064, rap0108, rap0109m, rap0115, rap0116, rap0117, rap1469m, rap1479, rap1723, rap1861, rap1863, rap1925m, rap1961, rap2602, rap2728

Comments:
This association is likely to be endemic to the western transverse ranges, primarily centered on the Santa Monica Mountains area. This association may be found on steep south-facing slopes often within the belt of summer fog and, thus, typically at lower elevation and more coastal settings than other associations of the *Salvia mellifera* Alliance.

Phases:
None

COMMON NAME	Black Sage-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland

PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salvia mellifera-Malosma laurina Shrubland Association

Black Sage-Laurel Sumac Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 8324

Local Description

Summary:
This shrubland association occurs on gentle to steep southeast and southwest-facing slopes at low elevations between 20–485 m. It is characterized by a dominance of *Salvia mellifera* and a subdominance of *Malosma laurina* in the shrub layer. The herbaceous layer and emergent tree layer are insignificant.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Eastern Urban Upper Elevation Santa Monica Mountains, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 20–485 m, mean 155.6 m
Aspect: southeast and southwest
Slope: range 3–45 degrees, mean 27.1 degrees
Topography (micro; macro): variable (all); bottom to top
Litter Cover: range 7–55%, mean 23.3%
Small Rock Cover: range 2–50%, mean 23.6%
Large Rock Cover: range 0–8%, mean 1.3%
Bare Ground: range 15–80%, mean 37.1%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (22–58%, mean 36.1%). Shrubs occur in two different strata with low shrubs at 0–20 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–15%, mean 3.4%) at 0–2 m tall. Trees are occasionally emergent (0–9% cover, mean 0.3%) with hardwoods at 0–15 m tall. Total vegetation cover is 25–60%, mean cover is 39.6%.

In this association, the shrub layer is characterized by *Salvia mellifera, Malosma laurina,* and *Artemisia californica. Yucca whipplei, Encelia californica, Eriogonum cinereum,* and *Rhus integrifolia* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Nassella lepida* and *Bromus madritensis.* Other herbs present may include *Leymus condensatus, Brassica nigra,* and *Nassella pulchra*.

***Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	18.9	6.0	35.0		X	
	MALA6	*Malosma laurina*	90	4.3	0.2	12.0		X	
	ARCA11	*Artemisia californica*	86	2.8	0.2	15.0		X	
	YUWH	*Yucca whipplei*	68	1.2	0.2	4.0			
	ENCA	*Encelia californica*	60	1.6	0.2	8.0			
	ERCI5	*Eriogonum cinereum*	58	1.4	0.2	9.0			
	RHIN2	*Rhus integrifolia*	56	2.4	0.2	15.0			
	LOSC2	*Lotus scoparius*	42	0.6	0.2	4.0			
	HASQ2	*Hazardia squarrosa*	40	0.4	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	34	0.8	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	26	0.5	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	26	0.5	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	22	0.2	0.2	2.5			
	SALE3	*Salvia leucophylla*	20	0.2	0.2	2.5			
Herb									
	NALE2	*Nassella lepida*	34	1.0	0.2	7.0			
	BRMA3	*Bromus madritensis*	28	0.1	0.2	2.0			X
	LECO12	*Leymus condensatus*	24	0.4	0.2	4.0			

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 2 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Erodium cicutarium, Pennisetum setaceum, Avena barbata, Erodium, Melilotus indicus, Avena, Nicotiana glauca, Salsola tragus, Avena fatua, Bromus diandrus, Foeniculum vulgare, Medicago polymorpha, Eucalyptus, Galium aparine, Melilotus albus, Ricinus communis

Samples Used in Description: (n = 50)
AA0004cc, AA0037cc, AA0038cc, AA0123cc, AA0181cc, AA0303cc, AA0329cc, AA0389cc, AA0393cc, AA0697, AA0741cc, AA0829, AA1019, rap0043, rap0522, rap0524, rap0562, rap0653, rap0674, rap0737, rap0974, rap0980, rap0984, rap0986, rap1002, rap1032, rap1048, rap1055, rap1057, rap1106, rap1107m, rap1115, rap1593m, rap1835, rap2074m, rap2108,

rap2193, rap2350, rap2465rlv, rap2479, rap2506, rap2538rlv, rap2540rlv, rap2730, rap2733, rap2861rlv, rap2882rlv, rap2884rlv, rap2885rlv, rap2886rlv

Comments:
This is the most widespread association of the *Salvia mellifera* Alliance expressed locally. *Malosma laurina* is a large shrub and appears as an emergent over the shorter drought deciduous *S. mellifera* in mature stands. Both of the main species in this association tolerate summer drought using different strategies—the shallow-rooted *S. mellifera* by dropping most of its leaves and the deep-rooted *Malosma* by tapping into moisture deep in the substrate. A phase of this association is found on steep coastward slopes and includes the presence of *Rhus integrifolia* as well as the other two main species**.**

Phases:
Salvia mellifera-Artemisia californica-Rhus integrifolia (Black Sage-California Sagebrush-Lemonade Berry) Phase [8322]
Salvia mellifera-Malosma laurina (Black Sage-Laurel Sumac) Phase [8324]

COMMON NAME	Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It probably occurs elsewhere in southern coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salvia mellifera-Rhus ovata Shrubland Association

Black Sage-Sugar Bush Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 8325

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and southeast-facing slopes at low elevations between 140–618 m. It is characterized by dominance of *Salvia mellifera* and subdominance of *Rhus ovata* in the shrub layer. The herbaceous and tree layers are insignificant.

Distribution:
This association is sampled in the Eastern Urban, Simi Hills Inland, Dry Inland, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 140–618 m, mean 325.2 m
Aspect: northeast and southeast
Slope: range 2–40 degrees, mean 29.4 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 15–50%, mean 30.6%
Small Rock Cover: range 8–25%, mean 16.7%
Large Rock Cover: range 0–25%, mean 3.7%
Bare Ground: range 15–55%, mean 41.4%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Salvia mellifera-Rhus ovata* Shrubland form an open to intermittent shrub layer (26–47%, mean 35.6%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–15%, mean 4.2%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 31–51%, mean cover is 40.4%.

In this association, the shrub layer is characterized by *Salvia mellifera* and *Rhus ovata. Artemisia californica, Heteromeles arbutifolia,* and *Malosma laurina* are often included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis, Leymus condensatus,* and *Hirschfeldia incana*.

***Salvia mellifera-Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	21.1	8.0	32.0	X	X	
	RHOV	*Rhus ovata*	100	6.3	2.0	15.0		X	
	ARCA11	*Artemisia californica*	68	1.3	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	63	1.3	0.2	4.0			
	MALA6	*Malosma laurina*	53	1.0	0.2	6.0			
	YUWH	*Yucca whipplei*	47	0.7	0.2	4.0			
	CEME	*Ceanothus megacarpus*	37	1.3	0.2	8.0			
	SALE3	*Salvia leucophylla*	37	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	26	0.7	0.2	9.0			
	ADFA	*Adenostoma fasciculatum*	26	0.1	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	21	0.5	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	21	0.4	0.2	2.5			
	ENCA	*Encelia californica*	21	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	21	0.3	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	42	0.7	0.2	3.0			X
	LECO12	*Leymus condensatus*	32	0.1	0.2	0.2			
	UNHE	Unknown herbs/forbs	26	1.3	2.5	12.0			
	HIIN3	*Hirschfeldia incana*	21	0.2	0.2	2.5			X

Other Noteworthy Species:
Juglans californica was found in 2 of 19 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Acacia redolens, Bromus hordeaceus, Bromus madritensis, Bromus diandrus, Brassica nigra, Nicotiana glauca, Piptatherum miliaceum

Samples Used in Description: (n = 19)
AA0169cc, AA0341, AA0395cc, AA0442cc, AA0459cc, AA0603, AA0740cc, AA0817, AA1098, rap0890, rap1477, rap1808, rap1809, rap2090, rap2313, rap2501, rap2564, rap2575, rap2688

Comments:
This association is primarily found in the warmer inland portions of the study area. Slopes tend to be facing cooler, shadier directions than in other *Salvia mellifera* Associations locally; however, slopes are still relatively steep. The presence of *Heteromeles arbutifolia* or *Ceanothus spinosus* in many stands also suggests a slightly more mesic setting than other *S. mellifera* associations. High frost frequency may play a role in favoring *R. ovata* over *M. laurina* in these stands.

Phases:
None

COMMON NAME Black Sage-Sugar Bush Shrubland Association
SYNONYM None
PHYSIOGNOMIC CLASS III. Shrubland

PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is known from the Santa Monica Mountains and western Riverside County (Klein and Evens 2005). Information about its global distribution is not available without additional inventory but is likely to include much of interior south coastal California inland from the immediate coast.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
Samples from western Riverside County (Klein and Evens 2005) add the following information: In the *Salvia mellifera-Rhus ovata* Association, *Rhus ovata* is consistently present as a codominant or subdominant shrub. *Eriogonum fasciculatum*, *Artemisia californica*, *Encelia farinosa*, *Adenostoma fasciculatum,* and *Ceanothus crassifolius* are occasionally to often present as subdominant shrubs.

Comments:
Heteromeles arbutifolia is a less common associate of this type in western Riverside County than in the Santa Monica Mountains.

References:
Klein and Evens 2005

Salvia mellifera-Artemisia californica Shrubland Association

Black Sage-California Sagebrush Shrubland Association
***Salvia mellifera-Artemisia californica* Shrubland Alliance**
Black Sage-California Sagebrush Shrubland Alliance

Mapping Code: 3421

Local Description

Summary:
This shrubland association occurs on moderate to steep slopes of variable aspect at low elevations between 0–415 m. It is characterized by a codominance of *Salvia mellifera* and *Artemisia californica* in the shrub layer. The herbaceous layer is composed of a variety of mostly nonnative species at low cover. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Immediate Coast, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–415 m, mean 231.7 m
Aspect: variable
Slope: range 14–36 degrees, mean 24 degrees
Topography (micro; macro): undulating, flat, or convex; lower slope to ridgetop
Litter Cover: range 25–45%, mean 32.5%
Small Rock Cover: range 2–30%, mean 12.7%
Large Rock Cover: range 0–5%, mean 2%
Bare Ground: range 15–53%, mean 36.2%
Parent Material: sedimentary or igneous
Soil Texture: coarse to very fine loamy sand

Vegetation Description:
Stands of *Salvia mellifera-Artemisia californica* Shrubland form an open to intermittent shrub layer (31–45%, mean 39.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–13%, mean 3.2%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 34–55%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Salvia mellifera*. *Malosma laurina* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and often includes *Hirschfeldia incana*. Other herbs present may include *Melica imperfecta, Bromus madritensis*, *Leymus condensatus,* and *Calystegia macrostegia*.

***Salvia mellifera-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.2	0.2	2.0			
Shrub									
	SAME3	*Salvia mellifera*	100	16.4	10.0	21.0	X	X	
	ARCA11	*Artemisia californica*	100	11.7	5.0	23.0		X	
	MALA6	*Malosma laurina*	60	1.9	1.0	6.0			
	ADFA	*Adenostoma fasciculatum*	50	0.6	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	40	1.5	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	40	0.6	0.2	2.5			
	RHIL	*Rhamnus ilicifolia*	40	0.4	0.2	2.5			
	YUWH	*Yucca whipplei*	40	0.4	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	30	1.0	0.2	9.0			
	HEAR5	*Heteromeles arbutifolia*	30	0.5	1.0	2.0			
	ERCI5	*Eriogonum cinereum*	30	0.4	1.0	2.0			
	LOSC2	*Lotus scoparius*	30	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	30	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	20	1.2	3.0	9.0			
	ENCA	*Encelia californica*	20	0.9	2.5	6.0			
	SALE3	*Salvia leucophylla*	20	0.3	1.0	2.5			
	QUBE5	*Quercus berberidifolia*	20	0.3	1.0	2.0			
	CEME	*Ceanothus megacarpus*	20	0.3	0.2	2.5			
	COGI	*Coreopsis gigantea*	20	0.2	0.2	2.0			
	CESP	*Ceanothus spinosus*	20	0.01	0.2	0.2			
	ERCO25	*Eriophyllum confertiflorum*	20	0.01	0.2	0.2			
	KECO	*Keckiella cordifolia*	20	0.01	0.2	0.2			
	RIMA	*Ribes malvaceum*	20	0.01	0.2	0.2			
Herb									
	HIIN3	*Hirschfeldia incana*	50	0.4	0.2	2.5			X
	MEIM	*Melica imperfecta*	30	0.5	0.2	4.0			
	BRMA3	*Bromus madritensis*	30	0.3	0.2	2.5			X
	LECO12	*Leymus condensatus*	30	0.1	0.2	0.2			
	FOVU	*Foeniculum vulgare*	20	0.8	0.2	8.0			X
	CEME2	*Centaurea melitensis*	20	0.3	0.2	2.5			X
	NALE2	*Nassella lepida*	20	0.2	0.2	2.0			
	BRDI3	*Bromus diandrus*	20	0.1	0.2	1.0			X
	CAMA24	*Calystegia macrostegia*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Bromus madritensis, Foeniculum vulgare, Centaurea melitensis, Bromus diandrus, Anagallis arvensis, Brassica nigra, Carduus pycnocephalus, Erodium cicutarium, Marrubium vulgare, Piptatherum miliaceum

Samples Used in Description: (n = 10)
AA0254cc, AA0420, AA0860, AA0912, rap0297, rap1720, rap1755, rap2072, rap2481, rap2907rlv

Comments:
This is a relatively uncommon association in the study area. Since sampling in these facultatively drought deciduous shrublands occurred throughout much of the year, the variance of total cover and individual species cover is expected to be high. The *S. mellifera* association of the same alliance can be differentiated from this association by its monospecific dominance of black sage.

Phases:
None

COMMON NAME	Black Sage-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera-Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur much farther north in the central coast ranges of California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Sambucus mexicana/Leymus condensatus-Annual Herb Shrubland Association

Mexican Elderberry/Giant Wild Rye-Annual Herb Shrubland Association
***Sambucus mexicana* Shrubland Alliance**
Mexican Elderberry Shrubland Alliance

Mapping Code: 3021

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and northwest-facing slopes at low elevations between 0–511 m. It is characterized by dominance in the shrub layer or the low tree layer of *Sambucus mexicana* and relatively high cover of the grass *Leymus condensatus* in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Immediate Coast, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–511 m, mean 270.2 m
Aspect: northeast and northwest
Slope: range 2–35 degrees, mean 18.6 degrees
Topography (micro; macro): undulating, concave, or flat; bottom to middle slope
Litter Cover: range 45–85%, mean 66.7%
Small Rock Cover: range 0–10%, mean 3.4%
Large Rock Cover: no data
Bare Ground: range 10–40%, mean 24.2%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Sambucus mexicana/Leymus condensatus-Annual Grass-Herb* Shrubland form an open to intermittent shrub layer (0–51%, mean 16.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (11–57%, mean 29.7%) at 0–1 m tall. Trees are occasionally emergent (0–27% cover, mean 12.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 46–70%, mean cover is 57.4%.

In this association, the shrub layer often includes *Sambucus mexicana, Baccharis pilularis,* and *Artemisia californica. Malosma laurina, Hazardia squarrosa,* and *Nicotiana glauca* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia*, *Juglans californica,* and *Schinus molle* at low cover. The herbaceous layer is simple and is characterized by *Leymus condensatus* and *Brassica nigra*. Other herbs sometimes include *Bromus diandrus, Marah macrocarpus, Centaurea melitensis*, *Conium maculatum,* and *Bromus madritensis.*

***Sambucus mexicana/Leymus condensatus-Annual Herb* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	1.4	3.0	5.0			
	JUCA-T	*Juglans californica*	22	0.8	3.0	4.0			
Tree Understory									
	SAME5	*Sambucus mexicana*	44	5.7	7.0	19.0			
Shrub									
	SAME5	*Sambucus mexicana*	56	11.1	7.0	50.0	X		
	BAPI	*Baccharis pilularis*	56	0.9	0.2	4.0			
	ARCA11	*Artemisia californica*	56	0.4	0.2	2.0			
	MALA6	*Malosma laurina*	44	0.5	0.2	2.0			
	HASQ2	*Hazardia squarrosa*	33	0.2	0.2	1.0			
	NIGL	*Nicotiana glauca*	33	0.1	0.2	0.2			X
	RHIN2	*Rhus integrifolia*	22	0.9	1.0	7.0			
	RICO3	*Ricinus communis*	22	0.2	0.2	2.0			X
	CESP	*Ceanothus spinosus*	22	0.1	0.2	1.0			
	RISP	*Ribes speciosum*	22	0.1	0.2	1.0			
Herb									
	LECO12	*Leymus condensatus*	78	8.7	1.0	57.0	X	X	
	BRNI	*Brassica nigra*	78	4.5	0.2	15.0		X	X
	BRDI3	*Bromus diandrus*	44	3.2	0.2	25.0			X
	MAMA8	*Marah macrocarpus*	44	0.7	0.2	4.0			
	CEME2	*Centaurea melitensis*	44	0.5	0.2	3.0			X
	COMA2	*Conium maculatum*	33	1.3	2.0	6.0			X
	BRMA3	*Bromus madritensis*	33	0.4	0.2	2.0			X
	MAVU	*Marrubium vulgare*	33	0.2	0.2	1.0			X
	BROMU	*Bromus*	22	3.6	2.0	30.0			
	URUR	*Urtica urens*	22	0.7	1.0	5.0			X
	MAPA5	*Malva parviflora*	22	0.1	0.2	1.0			X
	ARDO3	*Artemisia douglasiana*	22	0.01	0.2	0.2			
	ASFA	*Asclepias fascicularis*	22	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Conium maculatum, Bromus madritensis, Marrubium vulgare, Nicotiana glauca, Urtica urens, Ricinus communis, Malva parviflora, Centaurea solstitialis, Ageratina adenophora, Galium aparine, Eucalyptus, Foeniculum vulgare, Schinus molle, Avena fatua, Bromus hordeaceus, Lactuca serriola, Melilotus indicus, Pennisetum setaceum, Piptatherum miliaceum, Silybum marianum, Sonchus oleraceus

Samples Used in Description: (n = 9)
rap0843, rap0978, rap1132, rap1852, rap2022, rap2177m, rap2363, rap2568, rap2651

Comments:
This association is found scattered throughout the study area usually in mesic settings. The settings seem to reflect some level of past disturbance from fire or nonnatural clearing and suggest in some cases the removal of higher cover of trees or coastal scrub species recently. Some natural stands are semiriparian. The relatively low constancy values for *Sambucus mexicana* in either the tree or the shrub layer do not reflect the absence of the species in some stands. Taken cumulatively, *S. mexicana* either as a shrub or a small tree is present in all of the stands.

Phases:
None

COMMON NAME	Mexican Elderberry/Giant Wild Rye-Annual Herb Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.B. Deciduous shrubland
Formation Group	III.B.2. Cold-deciduous shrubland
FORMATION SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION NAME	III.B.2.N.c. Intermittently flooded, cold-deciduous shrubland
ALLIANCE	*Sambucus mexicana* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Similar, though probably not identical, stands occur in the California coast ranges as far north as Marin County (Keeler-Wolf et al. 2003) and south to San Diego County (Evens and San 2005). Holland 1986 describes an elderberry savanna from the Central Valley.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Scattered stands of *Sambucus mexicana* occur throughout much of cismontane California but have not been well sampled. Contradictory to the formal hierarchy above, many stands are not intermittently flooded, at least not in the urban portions of Santa Monica Mountains study area.

References:
Evens and San 2005, Holland 1986, Keeler-Wolf et al. 2003

Sambucus mexicana-Heteromeles arbutifolia/Annual Grass-Herb Shrubland Association

Mexican Elderberry-Toyon/Annual Grass-Herb Shrubland Association
***Sambucus mexicana* Shrubland Alliance**
Mexican Elderberry Shrubland Alliance

Mapping Code: 3022

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep usually north-facing slopes at low elevations between 261–420 m. It is dominated by *Sambucus mexicana* and secondarily by *Heteromeles arbutifolia* in the shrub layer. The herbaceous layer is diverse, with *Leymus condensatus* often present at low to moderate cover. Other herbs are occasionally present such as *Bromus, Marah macrocarpus, Cortaderia,* and *Cuscuta californica*. The tree layer is occasionally present with species such as *Quercus agrifolia* and/or *Juglans californica.*

Distribution:
This association is sampled in the Eastern Urban, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 261–420 m, mean 331.4 m
Aspect: frequently northwest or northeast, rarely southwest or variable
Slope: range 15–38 degrees, mean 31.6 degrees
Topography (micro; macro): often undulating or convex; often mid to upper slopes, sometimes to bottom or ridgetop
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: frequently sedimentary, sometimes depositional or igneous
Soil Texture: no data

Vegetation Description:
Stands of *Sambucus mexicana-Heteromeles arbutifolia/*Annual Grass-Herb Shrubland form an open to intermittent shrub layer (19–37%, mean 27.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0.0–26%, mean 13.7%) at 0.01–2 m tall. Trees are occasionally emergent (0.0–21% cover, mean 12.1%) usually with hardwoods at 0–10 m tall. Total vegetation cover is 45.0–60%, mean cover is 53.3%.

In this association, the shrub layer is dominated primarily by *Sambucus mexicana* and secondarily by *Heteromeles arbutifolia.* A variety of other shrubs is often present at low cover including *Toxicodendron diversilobum, Malosma laurina, Mimulus aurantiacus,* and *Ceanothus megacarpus.* Other coastal sage and chaparral species are occasionally included in this layer. The herbaceous layer is variable and includes a variety of grasses and forbs. Often occurring is *Leymus condensatus* at low to moderate cover, while *Bromus, Marah macrocarpus, Cortaderia,* and *Cuscuta californica* are occasionally present. The tree layer sometimes includes *Quercus agrifolia* and/or *Juglans californica.*

***Sambucus mexicana-Heteromeles arbutifolia*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	43	1.3	1.0	5.0			
Tree Understory									
	JUCA-M	*Juglans californica*	29	0.3	0.2	2.0			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	100	6.0	1.0	12.0		X	
	SAME5	*Sambucus mexicana*	86	12.6	8.0	21.0	X	X	
	TODI	*Toxicodendron diversilobum*	57	3.7	2.0	15.0			
	MALA6	*Malosma laurina*	57	1.4	1.0	6.0			
	MIAU	*Mimulus aurantiacus*	57	0.8	0.2	4.0			
	CEME	*Ceanothus megacarpus*	57	0.6	0.2	2.0			
	SAME3	*Salvia mellifera*	43	0.9	0.2	5.0			
	BAPI	*Baccharis pilularis*	43	0.7	1.0	2.0			
	RHOV	*Rhus ovata*	43	0.6	0.2	3.0			
	CESP	*Ceanothus spinosus*	29	2.3	6.0	10.0			
	KECO	*Keckiella cordifolia*	29	1.1	2.0	6.0			
	ARCA11	*Artemisia californica*	29	0.5	0.2	3.0			
	RIMA	*Ribes malvaceum*	29	0.3	1.0	1.0			
	RISP	*Ribes speciosum*	29	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	57	8.7	2.0	26.0	X		
	BROMU	*Bromus*	29	3.6	0.2	25.0			
	UNGR	Unknown annual grass	29	1.3	2.0	7.0			
	MAMA8	*Marah macrocarpus*	29	0.3	1.0	1.0			
	CORTA	*Cortaderia*	29	0.1	0.2	0.2			X
	CUCA	*Cuscuta californica*	29	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Cortaderia, Brassica nigra, Nicotiana glauca, Ageratina adenophora, Eucalyptus, Spartium junceum, Centaurea melitensis, Conyza canadensis, Erodium, Hirschfeldia incana, Senecio mikanioides

Samples Used in Description: (n = 7)
rap0832, rap0844, rap1354, rap1935, rap2161, rap2609, rap2616

Comments:
None

Phases:
None

COMMON NAME	Mexican Elderberry-Toyon/Annual Grass-Herb Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION	III.B.2.N.c. Intermittently flooded, cold-deciduous shrubland
ALLIANCE	*Sambucus mexicana* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Spartium junceum Shrubland Alliance

Spanish Broom Shrubland Alliance

Mapping Code: 9542

Local Description

Summary:
This shrubland alliance occurs on gentle to steep northeast-facing slopes at low to mid elevations between 226–820 m. It is dominated by *Spartium junceum* in the shrub layer and several nonnative grasses and forbs in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* and nonnative *Pinus* sp.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 226–820 m, mean 478 m
Aspect: northeast
Slope: range 2–38 degrees, mean 25.8 degrees
Topography (micro; macro): flat or undulating; mid to upper slope
Litter Cover: no data
Small Rock Cover: range 5–25%, mean 16.2%
Large Rock Cover: range 0–20%, mean 5.5%
Bare Ground: range 5–40%, mean 19.2%
Parent Material: igneous, quaternary, or sedimentary
Soil Texture: coarse loamy sand

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (21–53%, mean 33.6%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–6%, mean 2.6%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 1.4%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 25–55%, mean cover is 36%.

In this association, the shrub layer is characterized by *Spartium junceum. Malosma laurina* and *Salvia mellifera* are occasionally included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia and Pinus* sp. at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis* and *Foeniculum vulgare.* Other herbs may include *Centaurea melitensis, Malacothrix saxatilis,* and *Bromus diandrus.*

Spartium junceum Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	57	0.3	0.2	1.0			
	PINUS	*Pinus*	29	1.1	1.0	7.0			X
Shrub									
	SPJU2	*Spartium junceum*	100	25.3	15.0	44.0	X	X	X
	MALA6	*Malosma laurina*	71	0.5	0.2	1.0			
	SAME3	*Salvia mellifera*	57	0.3	0.2	1.0			
	NIGL	*Nicotiana glauca*	43	0.8	0.2	5.0			X
	LOSC2	*Lotus scoparius*	43	0.5	0.2	2.0			
	ERFA2	*Eriogonum fasciculatum*	29	1.0	3.0	4.0			
	CESP	*Ceanothus spinosus*	29	0.6	1.0	3.0			
	ARCA11	*Artemisia californica*	29	0.2	0.2	1.0			
	RHOV	*Rhus ovata*	29	0.1	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	71	1.0	0.2	2.0			X
	FOVU	*Foeniculum vulgare*	71	0.5	0.2	3.0			X
	PIMI3	*Piptatherum miliaceum*	43	1.0	1.0	3.0			X
	BRDI3	*Bromus diandrus*	43	0.2	0.2	1.0			X
	CEME2	*Centaurea melitensis*	43	0.1	0.2	0.2			X
	MASA2	*Malacothrix saxatilis*	43	0.1	0.2	0.2			
	PHACE	*Phacelia*	29	0.4	1.0	2.0			
	GNAPH	*Gnaphalium*	29	0.3	0.2	2.0			
	BRNI	*Brassica nigra*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 1 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Spartium junceum, Bromus madritensis, Foeniculum vulgare, Piptatherum miliaceum, Nicotiana glauca, Bromus diandrus, Centaurea melitensis, Brassica nigra, Avena, Ricinus communis

Samples Used in Description: (n = 7)
AA0641, rap0010, rap0011m, rap0015, rap0242m, rap0276, rap0278

Comments:
This alliance apparently began as plantations or seedings along road cuts on several major roads crossing the Santa Monica Mountains. These stands have persisted but so far have not proliferated much beyond their originally established locations.

Phases:
None

COMMON NAME Spanish Broom Shrubland Alliance
SYNONYM Broom Stands (Sawyer and Keeler-Wolf 1995)
PHYSIOGNOMIC CLASS Shrubland

PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Microphyllous evergreen shrubland
ALLIANCE	*Spartium junceum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	Exotic

Global Description

Distribution:
In California broom stands occur throughout the southern, central, and northern California coast ranges; the Klamath Mountains and southern Cascades; the southern California mountains and valleys; and the Sierra Nevada Mountains and its foothills. This Spanish broom alliance, recently segregated from the generic broom alliance of Sawyer and Keeler-Wolf 1995, is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
All upland slopes; elevation sea level–1,000 m

Vegetation Description:
Cytisus scoparius, Genista monspessulana, Spartium junceum, or *Ulex europaea* is the sole dominant shrub in the canopy; other species of *Cytisus* or *Genista* may be present. Emergent trees may be present. Shrubs are less than 6 m; canopy is continuous. Ground layer is sparse.

Comments:
The following statement is taken from Sawyer et al. 2006 MS: Invasiveness of broom species is well appreciated. Ten species of broom or gorse from four legume genera are included in this type. Hickman 1993 recognizes three *Cytisus*, five *Genista*, one *Spartium*, and one *Ulex* in California. French broom, Spanish broom, and Scotch broom are the major invading brooms of disturbed areas in the state. The following are uncommon or locally common: *Cytisus multiflorus*, *Cytisus striatus*, *Genista canariensis*, *Genista linifolia*, *Genista maderensis*, *Genista stenopetala*, and *Ulex europaea*. In areas where trees form dense canopies with age, broom is killed; however, a persistent seed bank remains. The treatment here is broad, recognizing the importance of these introduced species in the vegetation of California. The most invasive species in central California appears to be *Genista monspessulana.* It is likely that with further sampling, individual broom alliances and associations will be defined. These may include Spanish broom (*Spartium juncea*) from southern coastal California, French broom (*Genista monspessulana*) from central California, and Scotch broom (*Cytisus multiflorus*) from northern California.

References:
Hickman 1993, Sawyer and Keeler-Wolf 1995, Sawyer et al. 2006 MS

Toxicodendron diversilobum-Artemisia californica/Leymus condensatus Shrubland Association

Poison Oak-California Sagebrush/Giant Wild Rye Shrubland Association
***Toxicodendron diversilobum* Shrubland Alliance**
Poison Oak Shrubland Alliance

Mapping Code: 3331

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest- and northeast-facing slopes at low elevations between 0-719 m. It is characterized by a strong dominance of *Toxicodendron diversilobum* and a presence of *Artemisia californica* in the shrub layer. The herbaceous layer is characterized by relatively high cover of *Leymus condensatus.* The emergent tree layer may include *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Immediate Coast, Simi Hills Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 0–719 m, mean 297.6 m
Aspect: northwest and northeast
Slope: range 15–36 degrees, mean 31.1 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 55–55%, mean 55%
Small Rock Cover: range 3–5%, mean 4.3%
Large Rock Cover: range 0–8%, mean 2.7%
Bare Ground: range 11–35%, mean 22%
Parent Material: sedimentary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Shrubland form an open to continuous shrub layer (28–75%, mean 49.6%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–20%, mean 5%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 36–75%, mean cover is 55.1%.

In this association, the shrub layer is dominated by *Toxicodendron diversilobum. Artemisia californica* is also characteristically present. *Sambucus mexicana* and *Malosma laurina* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Leymus condensatus.* Other herbs sometimes include *Melica imperfecta* and *Hirschfeldia incana*.

***Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	TODI	*Toxicodendron diversilobum*	100	37.1	10.0	57.0	X	X	
	ARCA11	*Artemisia californica*	76	1.8	0.2	7.0		X	
	MALA6	*Malosma laurina*	53	2.1	0.2	18.0			
	SAME5	*Sambucus mexicana*	53	0.7	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	47	1.7	0.2	10.0			
	HEAR5	*Heteromeles arbutifolia*	47	0.6	0.2	3.0			
	SALE3	*Salvia leucophylla*	41	1.1	0.2	7.0			
	MAFA	*Malacothamnus fasciculatus*	29	0.4	0.2	3.0			
	BAPI	*Baccharis pilularis*	24	0.3	0.2	4.0			
Herb									
	LECO12	*Leymus condensatus*	76	5.2	0.2	20.0	X	X	

Other Noteworthy Species:
Juglans californica was found in 2 of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Myoporum laetum, Bromus diandrus, Foeniculum vulgare, Nasturtium, Tropaeolum

Samples Used in Description: (n = 17)
AA0574, AA1155, AA1213, rap0063m, rap1113m, rap1140m, rap1811, rap1909, rap1911, rap1931, rap1964, rap2057, rap2084m, rap2232, rap2271, rap2611, rap2931

Comments:
This is a broadly defined association that occurs from the immediate coast in mesic hollows receiving salt-laden fog to interior sheltered mesic slopes above 700 m elevation. Most of the stands are found coastally and have *Artemisia californica* and *Leymus condensatus.* Stands are usually small and associated with mesic coastal scrub stands or *Quercus agrifolia* stands. Seasonality of sampling may have resulted in lower covers for *Toxicodendron diversilobum* as it looses all leaves in the winter.

Phases:
None

COMMON NAME	Poison Oak-California Sagebrush/Giant Wild Rye Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.C - Mixed evergreen deciduous shrubland
FORMATION GROUP	III.C.2. Mixed evergreen cold-deciduous shrubland
FORMATION SUBGROUP	III.C.2.N. Natural/Seminatural mixed evergreen cold-deciduous shrubland

FORMATION NAME	III.C.2.N.a. Mixed evergreen cold-deciduous shrubland
ALLIANCE	*Toxicodendron diversilobum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to be found in other areas along the central and southern coast of California. The mixed evergreen and winter deciduous classification at the formation group level of the hierarchy is debatable, as many stands of this and other associations in this alliance are strongly dominated by the winter deciduous *Toxicodendron diversilobum*.

References:
None

Toxicodendron diversilobum-Mimulus aurantiacus Shrubland Association

Poison Oak-Bush Monkey Flower Shrubland Association
***Toxicodendron diversilobum* Shrubland Alliance**
Poison Oak Shrubland Alliance

Mapping Code: 3332

Local Description

Summary:
This shrubland association occurs on steep to very steep northeast- and northwest-facing slopes at low elevations between 125–591 m. It is characterized by a codominance of *Toxicodendron diversilobum* and *Mimulus aurantiacus* in the shrub layer. There are no characteristic species in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in about half the stands.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Immediate Coast Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 125–591 m, mean 282.7 m
Aspect: northeast and northwest
Slope: range 32–55 degrees, mean 39.6 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: no data
Small Rock Cover: range 20–20%, mean 20%
Large Rock Cover: range 6–6%, mean 6%
Bare Ground: range 30–30%, mean 30%
Parent Material: igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Toxicodendron diversilobum-Mimulus aurantiacus* Shrubland form an open to intermittent shrub layer (33–58%, mean 40.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–7%, mean 2.1%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 2.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 36–60%, mean cover is 44.1%.

In this association, the shrub layer is characterized by *Toxicodendron diversilobum* and *Mimulus aurantiacus. Artemisia californica, Malosma laurina,* and *Salvia leucophylla* are usually included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Quercus lobata* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus, Melica imperfecta,* and *Bromus diandrus.*

***Toxicodendron diversilobum-Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	43	1.1	2.0	3.0			
Shrub									
	MIAU	*Mimulus aurantiacus*	100	15.9	5.0	35.0	X	X	
	TODI	*Toxicodendron diversilobum*	100	13.1	9.0	20.0	X	X	
	ARCA11	*Artemisia californica*	71	1.3	1.0	4.0			
	MALA6	*Malosma laurina*	57	0.9	0.2	4.0			
	SALE3	*Salvia leucophylla*	57	0.6	0.2	2.0			
	HEAR5	*Heteromeles arbutifolia*	43	1.4	1.0	8.0			
	SAME3	*Salvia mellifera*	43	0.9	1.0	3.0			
	KECO	*Keckiella cordifolia*	43	0.7	0.2	4.0			
	RHIN2	*Rhus integrifolia*	43	0.2	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	29	2.4	8.0	9.0			
	CEME	*Ceanothus megacarpus*	29	1.1	2.0	6.0			
	ADFA	*Adenostoma fasciculatum*	29	0.2	0.2	1.0			
	YUWH	*Yucca whipplei*	29	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	43	0.2	0.2	1.0			
	MEIM	*Melica imperfecta*	29	1.3	4.0	5.0			
	BRDI3	*Bromus diandrus*	29	0.3	0.2	2.0			X

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Stellaria media, Ageratina adenophora, Avena, Carduus pycnocephalus, Centaurea melitensis, Foeniculum vulgare, Hirschfeldia incana

Samples Used in Description: (n = 7)
AA0575, AA0577, rap0836m, rap1671, rap1838, rap1904, rap2390m

Comments:
This association appears to be rare in the study area. It bears ecological relationships with *Quercus agrifolia* stands (often occurs on steep concave slopes adjacent to them) and also occurs adjacent to *Artemisia californica* Alliance stands in the coastal scrub. The presence of *Mimulus aurantiacus* in the study area often indicates steep but relatively mesic unstable slopes.

Phases:
None

COMMON NAME	Poison Oak-Bush Monkey Flower Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.C. Mixed evergreen deciduous shrubland
FORMATION GROUP	III.C.2. Mixed evergreen cold-deciduous shrubland
FORMATION SUBGROUP	III.C.2.N. Natural/Seminatural mixed evergreen cold-deciduous shrubland

FORMATION NAME	III.C.2.N.a. Mixed evergreen cold-deciduous shrubland
ALLIANCE	*Toxicodendron diversilobum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Both *Toxicodendron diversilobum* and *Mimulus aurantiacus* are widespread shrubs in coastal California ranging well north and south of the study area. It is likely that this association occurs farther north into the outer central coast ranges (e.g., Big Sur, Monterey County).

References:
None

Venegasia carpesioides Shrubland Alliance

Canyon Sunflower Shrubland Alliance

Mapping Code: 4750

Local Description

Summary:
This shrubland alliance occurs on steep northwest- and northeast-facing slopes at low elevations between 25–534 m. It is dominated by the leafy shrub *Venegasia carpesioides* in the shrub layer. There is a diverse herbaceous layer characterized by *Leymus condensatus.* The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 25–534 m, mean 211.4 m
Aspect: northwest and northeast
Slope: range 28–38 degrees, mean 33 degrees
Topography (micro; macro): undulating, concave, or convex; middle slope to ridge
Litter Cover: no data
Small Rock Cover: range 5–25%, mean 12.7%
Large Rock Cover: range 0–2%, mean 0.7%
Bare Ground: range 10–30%, mean 23.3%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (28–50%, mean 40.4%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (2–15%, mean 9%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 1.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 40–65%, mean cover is 50.2%.

In this association, the shrub layer is characterized by *Venegasia carpesioides, Malosma laurina,* and *Heteromeles arbutifolia*. *Mimulus aurantiacus, Artemisia californica, Salvia mellifera,* and *Toxicodendron diversilobum* are occasionally included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and is characterized by *Leymus condensatus* with *Bromus* sp. also occasionally present. Other herbs occasionally present may include *Hirschfeldia incana, Nassella pulchra, Brassica nigra,* and *Lathyrus laetiflorus.*

Venegasia carpesioides Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	40	1.5	0.2	7.5			
	JUCA-T	*Juglans californica*	20	0.5	2.5	2.5			
Shrub									
	VECA	*Venegasia carpesioides*	100	17.8	7.0	25.0	X	X	
	MALA6	*Malosma laurina*	100	4.7	1.0	8.0		X	
	HEAR5	*Heteromeles arbutifolia*	80	4.9	2.0	12.0		X	
	MIAU	*Mimulus aurantiacus*	60	3.1	2.0	7.5			
	ARCA11	*Artemisia californica*	60	1.5	2.0	3.0			
	SAME3	*Salvia mellifera*	60	0.8	0.2	3.0			
	TODI	*Toxicodendron diversilobum*	60	0.6	0.2	2.5			
	LOSC2	*Lotus scoparius*	40	1.4	3.0	4.0			
	CESP	*Ceanothus spinosus*	40	1.2	0.2	6.0			
	BAPI	*Baccharis pilularis*	40	0.7	1.0	2.5			
	RIMA	*Ribes malvaceum*	40	0.2	0.2	1.0			
	CEME	*Ceanothus megacarpus*	20	0.6	3.0	3.0			
	DERI	*Dendromecon rigida*	20	0.6	3.0	3.0			
	ERCI5	*Eriogonum cinereum*	20	0.6	3.0	3.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.6	3.0	3.0			
	CEBE3	*Cercocarpus betuloides*	20	0.5	2.5	2.5			
	RHOV	*Rhus ovata*	20	0.4	2.0	2.0			
	ENCA	*Encelia californica*	20	0.2	1.0	1.0			
	NIGL	*Nicotiana glauca*	20	0.2	1.0	1.0			X
	SAME5	*Sambucus mexicana*	20	0.2	1.0	1.0			
	SOXA	*Solanum xanti*	20	0.2	1.0	1.0			
	BAPL	*Baccharis plummerae*	20	0.0	0.2	0.2			
	KECO	*Keckiella cordifolia*	20	0.0	0.2	0.2			
	NEOL	*Nerium oleander*	20	0.0	0.2	0.2			X
Herb									
	LECO12	*Leymus condensatus*	80	6.9	7.5	11.0	X	X	
	BROMU	*Bromus*	40	0.5	0.2	2.5			
	HIIN3	*Hirschfeldia incana*	20	0.8	4.0	4.0			X
	NAPU4	*Nassella pulchra*	20	0.6	3.0	3.0			
	BRNI	*Brassica nigra*	20	0.5	2.5	2.5			X
	NASSE	*Nassella*	20	0.5	2.5	2.5			
	BRDI3	*Bromus diandrus*	20	0.4	2.0	2.0			X
	LALA2	*Lathyrus laetiflorus*	20	0.2	1.0	1.0			
	CAMA24	*Calystegia macrostegia*	20	0.0	0.2	0.2			
	CAAF	*Castilleja affinis*	20	0.0	0.2	0.2			
	CORTA	*Cortaderia*	20	0.0	0.2	0.2			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Brassica nigra, Bromus diandrus, Nicotiana glauca, Cortaderia, Medicago polymorpha, Nerium oleander

Samples Used in Description: (n = 5)
AA0325cc, rap0464, rap0927, rap1122, rap2656

Comments:
Stands dominated by canyon sunflower dominate on typically sheltered, northerly facing or concave slopes. They typically occur following burns in *Quercus agrifolia* woodlands or mesic chaparral such as the *Ceanothus spinosus* or *Quercus berberidifolia* alliances. Fire in mesic coastal scrub formerly dominated by *Artemisia californica*, *Mimulus aurantiacus*, and *Leymus condensatus* may also be dominated by *V. carpesioides*. Typically, canyon sunflower dominates for several years before shifting toward more long-persisting shrub dominance. Canyon sunflower occurs commonly in such situations along the coast of southern California but has only been sampled extensively in the Santa Monica Mountains in this study so far. Little detail is currently known about the duration of stands following fire. It appears to resprout and perhaps proliferate following fire and returns to relatively low cover and density in the understory of other shrubs and trees following intervals of more than 10 years without fire.

Phases:
None

COMMON NAME	Canyon Sunflower Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.a. Temperate broad-leaved evergreen shrubland
ALLIANCE	*Venegasia carpesioides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

HERBACEOUS VEGETATION DESCRIPTIONS

Arundo donax Herbaceous Alliance

Giant Reed Herbaceous Alliance

Mapping Code: 4310

Local Description

Summary:
Two stands of this herbaceous alliance occur on flat to steep, northeast-facing slopes at low elevations between 2 and 153 m. It is dominated by *Arundo donax* in the herbaceous layer. *Artemisia douglasiana*, *Foeniculum vulgare,* and *Malacothrix saxatilis* may also be included in this layer at low cover. *Baccharis pilularis* is found in the shrub layer at low cover, and *Platanus racemosa* is in the tree layer at low cover.

Distribution:
This association is sampled in the Immediate Coast region of the study area. It has also been seen in the Simi Valley, though not sampled there.

Environmental Description:
Elevation: range 2–153 m, mean 78 m
Aspect: flat to northeast
Slope: 0 to 34 degrees
Topography (micro; macro): flat to convex; bottom to mid
Litter Cover: 90% (in one sample)
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
Stands of this herbaceous alliance form an open to intermittent herbaceous layer (16–50%, mean 33%) at 2–5 m tall. The shrub layer is sparse to open (0–25%, mean 12.5%) at 0–5 m tall. Trees are emergent (1–4% cover, mean 2.5%) with hardwoods at 2–10 m tall. Total vegetation cover is 45–51%, mean cover is 48%.

In this alliance, the herbaceous layer is open to intermittent and is dominated by *Arundo donax*. This layer may also include *Artemisia douglasiana*, *Foeniculum vulgare,* and *Malacothrix saxatilis* at low cover. The shrub layer is low in cover and may include *Baccharis pilularis, Myoporum laetum, Heteromeles arbutifolia, Artemisia californica,* and *Malacothamnus fasciculatus*, and the tree layer may include *Platanus racemosa* as a sparse emergent.

Arundo donax Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	50	0.1	0.2	0.2	X		
Shrub									
	BAPI	*Baccharis pilularis*	50	4.0	8.0	8.0	X		
	MYLA5	*Myoporum laetum*	50	2.0	4.0	4.0			X
	HEAR5	*Heteromeles arbutifolia*	50	1.5	3.0	3.0			
	ARCA11	*Artemisia californica*	50	1.0	2.0	2.0			
	MAFA	*Malacothamnus fasciculatus*	50	1.0	2.0	2.0			
	CESP	*Ceanothus spinosus*	50	0.5	1.0	1.0			
	SALA6-M	*Salix lasiolepis*	50	0.5	1.0	1.0			
	BASA4	*Baccharis salicifolia*	50	0.1	0.2	0.2			
	NIGL	*Nicotiana glauca*	50	0.1	0.2	0.2			X
	RHIL	*Rhamnus ilicifolia*	50	0.1	0.2	0.2			
	SALE3	*Salvia leucophylla*	50	0.1	0.2	0.2			
Herb									
	ARDO4	*Arundo donax*	100	33.5	16.0	51.0	X	X	X
	ARDO3	*Artemisia douglasiana*	50	2.5	5.0	5.0			
	MASA2	*Malacothrix saxatilis*	50	1.0	2.0	2.0			
	FOVU	*Foeniculum vulgare*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Arundo donax, Myoporum laetum, Foeniculum vulgare, Nicotiana glauca

Samples Used in Description: (n = 2)
rap1361, rap2207m

Comments:
This is a dangerously invasive nonnative alliance that, once established, is very difficult to remove. It is easily spread along active stream channels during flooding events when the underground stolon and rootstalks are damaged, uprooted, and transported by water to new locations. This species is sometimes used as an ornamental locally.

Phases:
None

COMMON NAME	Giant Reed Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.i. Intermittently flooded temperate or subpolar grassland

ALLIANCE	*Arundo donax* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, invasive exotic

Global Description

Distribution:
This alliance is known from the Santa Monica Mountains region and also from elsewhere in California from Shasta County south to San Diego County. The species is introduced from Eurasia.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This alliance occurs on banks of streams, rivers, sloughs, and other water bodies in lower elevations of California.

Vegetation Description:
Dense monospecific clumps tend to form interspersed with native woody species such as *Salix lasiolepis, S. exigua, S. gooddingii, Baccharis salicifolia*, and so forth, along gravelly stream channels.

Comments:
This alliance is spreading throughout lower elevation riparian settings in California from the northern Central Valley to San Diego County along coastal streams and estuaries.

References:
Bossard et al. 2000

Avena fatua Herbaceous Association

Wild Oat Herbaceous Association
***Avena* spp. Herbaceous Alliance**
Wild Oat Herbaceous Alliance

Mapping Code: 4220

Local Description

Summary:
This herbaceous association occurs on gentle to steep often northwest- or southwest-facing slopes at low elevations between 165 and 268 m. *Avena fatua* is characteristically abundant in the herbaceous layer, and *Bromus diandrus* and *Brassica nigra* are often present. *Lotus scoparius, Baccharis pilularis*, and *Artemisia californica* are sometimes found in the shrub layer at low cover, and *Quercus agrifolia* is infrequently in the tree layer at low cover.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Dry Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 165–268 m, mean 214.6 m
Aspect: variable, but often northwest and southwest
Slope: range 2–35 degrees, mean 9.25 degrees
Topography (micro; macro): flat to undulating; most often bottom to mid
Litter Cover: range 35–60%, mean 51.7%
Small Rock Cover: range 0–8%, mean 2.3%
Large Rock Cover: range 0–2%, mean 0.3%
Bare Ground: range 0–35%, mean 10.3%
Parent Material: most often depositional or sedimentary, occasionally igneous
Soil Texture: fine or moderately fine clay

Vegetation Description:
Stands of the *Avena fatua* Herbaceous Association form an intermittent to continuous herbaceous layer (40–90%, mean 58.3%) at 0.01–1 m tall. The shrub layer is sparse to open (0–10%, mean 2.8%) at 0–2 m tall. Trees are infrequently emergent (0–0% cover, mean 0%) with hardwoods at 0–10 m tall. Total vegetation cover is 40–90%, mean cover is 61.1%.

In this association, the herbaceous layer is intermittent to continuous, and *Avena fatua* is characteristic. *Bromus diandrus* and *Brassica nigra* are often included in this layer. The shrub layer occasionally includes *Lotus scoparius, Baccharis pilularis*, and *Artemisia californica*. The tree layer infrequently includes *Quercus agrifolia* as an emergent.

***Avena fatua* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	LOSC2	*Lotus scoparius*	38	0.6	0.2	4.0			
	BAPI	*Baccharis pilularis*	38	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	38	0.4	0.2	2.0			
	SALE3	*Salvia leucophylla*	25	0.8	1.0	5.0			
	MALA6	*Malosma laurina*	25	0.2	0.2	1.0			
Herb									
	AVFA	*Avena fatua*	88	39.9	21.0	88.0	X	X	X
	BRDI3	*Bromus diandrus*	62	1.0	0.2	6.0			X
	BRNI	*Brassica nigra*	50	1.1	1.0	6.0			X
	BRMA3	*Bromus madritensis*	38	0.6	1.0	2.0			X
	DICA14	*Dichelostemma capitatum*	38	0.1	0.2	0.2			
	AVBA	*Avena barbata*	25	5.8	5.0	41.0			X
	VIVI	*Vicia villosa*	25	0.5	1.0	3.0			X
	ASFA	*Asclepias fascicularis*	25	0.1	0.2	0.2			
	LUPIN	*Lupinus*	25	0.1	0.2	0.2			
	MEPO3	*Medicago polymorpha*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 8 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Avena fatua, Bromus diandrus, Brassica nigra, Bromus madritensis, Avena barbata, Vicia villosa, Medicago polymorpha, Hirschfeldia incana, Lolium multiflorum, Erodium botrys, Bromus hordeaceus, Centaurea melitensis, Convolvulus arvensis, Erodium cicutarium, Erodium moschatum, Foeniculum vulgare, Rumex crispus

Samples Used in Description: (n = 8)
AA0947, rap0944, rap0946, rap1000, rap1262, rap1841, rap2527rlv, rap2528rlv

Comments:
This is the first report that has specifically defined an *Avena* sp. Alliance. Typically, these stands have been placed into the California annual grassland alliance (Sawyer and Keeler-Wolf 1995). All of these annual alliances vary greatly depending on annual climatic conditions.

Phases:
None

COMMON NAME	Wild Oat Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation

PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5 Note: Although *Avena fatua* and *A. barbata* were both introduced from Eurasia, the *Avena* stands may house a number of significant native annuals and perennial herbs. Thus, this is considered an association that has some conservation value.

Global Description

Distribution:
This association is defined from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to be extremely widespread throughout cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar association has been identified in the central coast ranges: *Avena barbata-Avena fatua* Association.

References:
Evens and San 2004, Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

California Annual Grassland/Herbaceous Alliance

Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 4340/5000

The California annual grassland alliance is represented by four associations locally. In addition to these, there is additional variation expressed in the herbaceous layer within six samples, which will be briefly described here. These samples occur on flat to steep slopes and from low to moderate elevations. Most of them had low cover of all species, but they were dominated by a high-diversity herb layer, thus making them hard to classify further than the alliance level. *Bromus diandrus, Brassica nigra,* and *Hirschfeldia incana* are the three species with the highest constancy in these six plots, and none had constancy greater than 67%. In addition, a variety of forbs also occurred across the stands and usually dominated the stands including *Camissonia bistorta, Lasthenia californica, Lotus* sp*., Lupinus succulentus, Hemizonia fasciculata,* and *Vicia villosa*. Further, *Calochortus catalinae* was found in 1 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Samples classified to the alliance level only:
AA1064, rap1326, rap1712, rap2519rlv, rap2520rlv, rap2640rlv

Brassica nigra Herbaceous Association

Black Mustard Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50006

Local Description

Summary:
This herbaceous association occurs on flat to steep, often northwest-facing slopes at low elevations between 7 and 436 m. *Brassica nigra* is characteristically abundant in the herbaceous layer, and *Leymus condensatus* is usually present. *Encelia californica* and *Artemisia californica* are occasionally found in the shrub layer at low cover, and *Juglans californica* is occasionally in the tree layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Eastern Urban, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 7–436 m, mean 270 m
Aspect: variable, but most often northwest
Slope: range 0–45 degrees, mean 22.8 degrees
Topography (micro; macro): no data
Litter Cover: range 20–80%, mean 43.3%
Small Rock Cover: range 2–30%, mean 13.4%
Large Rock Cover: no data
Bare Ground: range 10–78%, mean 38.6%
Parent Material: most often sedimentary, sometimes depositional
Soil Texture: fine to moderately fine clay or silty clay loam

Vegetation Description:
Stands of the *Brassica nigra* Herbaceous Association form an open to continuous herbaceous layer (18–70%, mean 37.5%) at 0.01–2 m tall. The shrub layer is sparse to open (0–12%, mean 4.4%) at 0–5 m tall. Trees are sometimes emergent (0–7% cover, mean 1.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 23–70%, mean cover is 42.7%.

In this association, the herbaceous layer is open to continuous, and *Brassica nigra* is characteristically abundant. *Bromus diandrus* and *Leymus condensatus* are usually included in this layer at low cover. The shrub layer occasionally includes *Encelia californica* and *Artemisia californica* at sparse cover. The tree layer occasionally includes *Juglans californica* as an emergent, while *Quercus agrifolia* and *Sambucus mexicana* occur infrequently at low cover.

***Brassica nigra* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	27	0.7	0.2	7.0			
Shrub									
	ENCA	*Encelia californica*	45	0.2	0.2	1.0			
	ARCA11	*Artemisia californica*	45	0.2	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	36	0.9	0.2	6.0			
	MALA6	*Malosma laurina*	36	0.5	0.2	2.0			
	NIGL	*Nicotiana glauca*	36	0.1	0.2	0.2			X
	BASA4	*Baccharis salicifolia*	27	0.3	0.2	3.0			
	ERCI5	*Eriogonum cinereum*	27	0.2	0.2	1.0			
	HASQ2	*Hazardia squarrosa*	27	0.1	0.2	1.0			
Herb									
	BRNI	*Brassica nigra*	100	25.4	11.0	46.0	X	X	X
	BRDI3	*Bromus diandrus*	55	0.7	0.2	4.0			X
	LECO12	*Leymus condensatus*	55	0.6	0.2	3.0			
	MAVU	*Marrubium vulgare*	27	0.8	0.2	8.0			X
	CEME2	*Centaurea melitensis*	27	0.6	0.2	5.0			X
	SIMA3	*Silybum marianum*	27	0.1	0.2	1.0			X

Other Noteworthy Species:
Juglans californica was found in 4 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Nicotiana glauca, Marrubium vulgare, Centaurea melitensis, Silybum marianum, Melilotus indicus, Conium maculatum, Lactuca serriola, Erodium moschatum, Erodium cicutarium, Ricinus communis, Bromus madritensis, Pennisetum setaceum, Sisymbrium

Samples Used in Description: (n = 11)
AA0931, rap1062, rap1065, rap1101, rap1329, rap1422, rap1442, rap1873m, rap1888, rap2059, rap2916rlv

Comments:
Although *Brassica nigra* forms weedy stands throughout much of cismontane California, this is the first time this association has been formally defined. In this report, we are considering it an expansion of the widely known California annual grassland alliance, now modified as the California annual grassland/herbaceous alliance to account for some associations being dominated by annual herbs instead of grasses. Some of the stands surveyed here seemed to be associated with a recent prescribed burn.

Phases:
None

COMMON NAME Black Mustard Herbaceous Association
SYNONYM California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986),

	Bromus (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: *Brassica nigra* stands are generally strongly dominated by *B. nigra*, an invasive weed with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California in disturbed pastures and grasslands.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Brassica nigra-Bromus diandrus Herbaceous Association

Black Mustard-Ripgut Brome Herbaceous Association
California Annual Grassland/Herbaceous Alliance

Mapping Code: 50009

Local Description

Summary:
This herbaceous association occurs on gentle to very steep slopes of variable aspect at low elevations between 37 and 495 m. It is codominated by *Bromus diandrus* and *Brassica nigra* in the herbaceous layer. *Malosma laurina, Hazardia squarrosa, Artemisia californica*, and *Salvia leucophylla* are sometimes found in the shrub layer at low cover, and *Quercus lobata, Q. agrifolia, Juglans californica*, and *Pinus* spp. are infrequently found in the tree layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 37–495 m, mean 321.4 m
Aspect: variable
Slope: range 2–48 degrees, mean 19.0 degrees
Topography (micro; macro): most often undulating or flat; variable
Litter Cover: range 25–85%, mean 60.3%
Small Rock Cover: range 0–70%, mean 11%
Large Rock Cover: range 0–2%, mean 0.7%
Bare Ground: range 0–64%, mean 23.3%
Parent Material: usually sedimentary, sometimes igneous, depositional, or metamorphic
Soil Texture: fine clay or moderately fine sandy or silty clay loam

Vegetation Description:
Stands of the *Brassica nigra-Bromus diandrus* Herbaceous Association form an open to intermittent herbaceous layer (16–65%, mean 42.3%) at 0.01–1 m tall. The shrub layer is sparse to open (0–12%, mean 3%) at 0–5 m tall. Trees are infrequently emergent (0–8% cover, mean 0.5%) with hardwoods at 0–15 m tall. Total vegetation cover is 20–65%, mean cover is 45.7%.

In this association, the herbaceous layer is open to intermittent and is codominated by *Bromus diandrus* and *Brassica nigra*. Other nonnative species such as *Centaurea melitensis*, *Hirschfeldia incana*, and *Avena fatua* are also occasionally included in this layer at relatively low cover. The shrub layer sometimes includes *Malosma laurina, Hazardia squarrosa, Artemisia californica*, and *Salvia leucophylla*. The tree layer infrequently includes *Quercus lobata, Q. agrifolia, Juglans californica*, and *Pinus* spp. as emergent trees.

***Brassica nigra-Bromus diandrus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	33	0.5	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	29	0.4	0.2	2.5			
	ARCA11	*Artemisia californica*	25	0.8	0.2	7.5			
	SALE3	*Salvia leucophylla*	25	0.4	0.2	2.5			
	NIGL	*Nicotiana glauca*	21	0.5	0.2	10.0			X
	BAPI	*Baccharis pilularis*	21	0.3	0.2	2.5			
	SAME5	*Sambucus mexicana*	21	0.2	0.2	2.5			
Herb									
	BRNI	*Brassica nigra*	96	11.2	2.0	25.0		X	X
	BRDI3	*Bromus diandrus*	75	17.8	4.0	50.0	X	X	X
	CEME2	*Centaurea melitensis*	33	0.4	0.2	4.0			X
	HIIN3	*Hirschfeldia incana*	29	1.5	0.2	15.0			X
	AVFA	*Avena fatua*	29	0.4	0.2	4.0			X
	BROMU	*Bromus*	21	3.8	2.0	30.0			
	LASE	*Lactuca serriola*	21	0.6	0.2	7.5			X

Other Noteworthy Species:
Ericameria palmeri was found in 1 of 24 surveys of this plant community, which could be the rare variety *E. p.* var. *pachylepis.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 0, and CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 2 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Hirschfeldia incana, Avena fatua, Lactuca serriola, Nicotiana glauca, Bromus madritensis, Erodium, Erodium cicutarium, Melilotus indicus, Medicago polymorpha, Carduus pycnocephalus, Marrubium vulgare, Vicia villosa, Sonchus oleraceus, Avena, Silybum marianum, Foeniculum vulgare, Raphanus sativus, Ricinus communis, Malva parviflora, Rumex crispus, Euphorbia terracina, Galium aparine, Anagallis arvensis, Bromus hordeaceus, Cirsium vulgare, Melilotus albus, Melilotus officinalis, Pennisetum setaceum, Salsola tragus, Stellaria media

Samples Used in Description: (n = 24)
AA0044cc, AA0101cc, AA0111cc, AA0145cc, AA0168cc, AA0310cc, AA0324cc, AA0731, rap0733, rap0764, rap0820, rap1041, rap1094m, rap1246, rap1317, rap1502, rap1554, rap1571, rap2521rlv, rap2522rlv, rap2771, rap2891rlv, rap2892rlv, rap2917rlv

Comments:
Stands of this association are typically the result of high disturbance through grazing, fire, clearing, mechanical treatments, or a combination of the above. All three of the associations with mixtures of *Brassica nigra* and annual herbs and grasses may be considered closely related. They may ultimately be lumped into a single black mustard-weedy herbaceous association of the California annual grassland alliance. However, since analysis suggests these types do separate

out at least floristically, we are maintaining their distinction here until further detailed releve-based sampling is done to determine their relationships.

Phases:
None

COMMON NAME	Black Mustard-Ripgut Brome Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *B. nigra and Bromus diandrus*, both invasive weeds with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Brassica nigra-Centaurea melitensis Herbaceous Association

Black Mustard-Maltese Star Thistle Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50008

Local Description

Summary:
This herbaceous association occurs on gentle to steep slopes of variable aspect at low elevations between 41 and 483 m. It is codominated by *Centaurea melitensis* and *Brassica nigra* in the herbaceous layer. *Hazardia squarrosa, Salvia leucophylla,* and *Artemisia californica* are often found in the shrub layer at low cover, and *Juglans californica* and *Quercus agrifolia* are infrequently in the tree layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 41–483 m, mean 319.9 m
Aspect: variable
Slope: range 2–35 degrees, mean 16 degrees
Topography (micro; macro): usually flat or undulating; variable, but often mid to top
Litter Cover: range 10–60%, mean 35.3%
Small Rock Cover: range 0–60%, mean 12.3%
Large Rock Cover: range 0–2%, mean 0.9%
Bare Ground: range 4–75%, mean 35.8%
Parent Material: sedimentary
Soil Texture: fine to moderately fine clay or clay loam

Vegetation Description:
Stands of the *Brassica nigra-Centaurea melitensis* Herbaceous Association form an open to intermittent herbaceous layer (10–65%, mean 28.9%) at 0.01–1 m tall. The shrub layer is sparse to open (0–18%, mean 6.2%) at 0–5 m tall. Trees are infrequently emergent (0–1% cover, mean 0.1%) with hardwoods at 0–5 m tall. Total vegetation cover is 15–65%, mean cover is 35%.

In this association, the herbaceous layer is open to intermittent and is codominated by *Centaurea melitensis* and *Brassica nigra*. *Bromus madritensis* usually occurs in this layer and *Avena fatua*, *Hirschfeldia incana*, and *Bromus diandrus* may also occasionally be found at relatively low cover. The shrub layer is open and often includes *Hazardia squarrosa, Salvia leucophylla,* and *Artemisia californica,* while *Malacothamnus fasciculatus, Encelia californica*, and *Eriogonum cinereum* are also sometimes present. The tree layer infrequently includes *Juglans californica* and *Quercus agrifolia* as sparse emergent trees.

***Brassica nigra-Centaurea melitensis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	56	1.1	0.2	6.0			
	SALE3	*Salvia leucophylla*	56	0.9	0.2	3.0			
	ARCA11	*Artemisia californica*	56	0.4	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	33	1.2	1.0	7.5			
	ENCA	*Encelia californica*	33	0.1	0.2	0.2			
	ERCI5	*Eriogonum cinereum*	33	0.1	0.2	0.2			
	MALA6	*Malosma laurina*	22	0.4	0.2	3.0			
	BAPI	*Baccharis pilularis*	22	0.3	0.2	2.5			
	BASA4	*Baccharis salicifolia*	22	0.3	0.2	2.5			
	ERFA2	*Eriogonum fasciculatum*	22	0.2	0.2	2.0			
	LOSC2	*Lotus scoparius*	22	0.01	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	100	11.3	3.0	28.0	X	X	X
	BRNI	*Brassica nigra*	100	7.9	2.5	20.0		X	X
	BRMA3	*Bromus madritensis*	56	1.9	1.0	11.0			X
	AVFA	*Avena fatua*	44	1.5	0.2	9.0			X
	HIIN3	*Hirschfeldia incana*	44	0.6	0.2	2.5			X
	BRDI3	*Bromus diandrus*	44	0.4	0.2	2.0			X
	BROMU	*Bromus*	33	1.9	2.5	7.5			
	BRHO2	*Bromus hordeaceus*	33	0.7	0.2	6.0			X
	DICA14	*Dichelostemma capitatum*	33	0.7	0.2	6.0			
	AVENA	*Avena*	33	0.6	0.2	2.5			X
	ERCI6	*Erodium cicutarium*	33	0.1	0.2	0.2			X
	HEFA	*Hemizonia fasciculata*	22	0.9	1.0	7.5			
	MEIN2	*Melilotus indicus*	22	0.6	2.0	3.0			X
	LECO12	*Leymus condensatus*	22	0.3	0.2	2.5			
	NALE2	*Nassella lepida*	22	0.3	0.2	2.5			
	LUSU3	*Lupinus succulentus*	22	0.2	0.2	2.0			
	PHCI	*Phacelia cicutaria*	22	0.1	0.2	1.0			
	MASA2	*Malacothrix saxatilis*	22	0.01	0.2	0.2			
	SOAS	*Sonchus asper*	22	0.01	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Avena fatua, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Avena, Erodium cicutarium, Melilotus indicus, Sonchus

asper, Lactuca serriola, Silybum marianum, Anagallis arvensis, Carduus pycnocephalus, Cirsium vulgare, Galium aparine, Marrubium vulgare, Medicago polymorpha, Rumex crispus,

Samples Used in Description: (n = 9)
AA0152cc, AA0400cc, AA0463cc, rap0650, rap1402, rap1557, rap1585, rap1807, rap2915rlv

Comments:
Stands of this association are typically the result of high disturbance through grazing, fire, clearing, mechanical treatments, or a combination of the above. All three of the associations with mixtures of *Brassica nigra* and annual herbs and grasses may be considered closely related. They may ultimately be lumped into a single black mustard-weedy herbaceous association of the California annual grassland alliance. However, since analysis suggests these types do separate out at least floristically, we are maintaining their distinction here until further detailed releve-based sampling is done to determine their relationships. Based on the data from this report, this association seems to have a higher probability of having native herbaceous species than the other *Brassica nigra*-dominated associations in this alliance. This is the only association of this alliance where locally *Nassella lepida*, a native perennial grass, was found in > 20% constancy, as well as many forb species such as *Dichelostemma capitatum, Hemizonia fasciculata, Lupinus succulentus,* and *Phacelia cicutaria*.

Phases:
None

COMMON NAME	Black Mustard-Maltese Star Thistle Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *B. nigra and C. melitensis*, both invasive weeds with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Bromus diandrus Herbaceous Association

Ripgut Brome Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50005

Local Description

Summary:
This herbaceous association occurs on flat to steep often northwest- or southwest-facing slopes at elevations between 31 and 613 m. *Bromus diandrus* is abundant in the herbaceous layer and *Brassica nigra* is often present at low cover. *Malosma laurina, Baccharis pilularis, Sambucus mexicana, Ceanothus megacarpus, Salvia mellifera,* and *Heteromeles arbutifolia* are occasionally found in the shrub layer at low cover, and *Quercus agrifolia* is infrequently found in the tree layer at low cover.

Distribution:
This association is sampled in the Eastern Urban, Western Fog Zone, Upper Elevation Santa Monica Mountains, Immediate Coast, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 31–613 m, mean 260.9 m
Aspect: variable, but most often southwest or northwest
Slope: range 0–40 degrees, mean 19.4 degrees
Topography (micro; macro): usually flat or undulating; variable
Litter Cover: range 35–60%, mean 47.5%
Small Rock Cover: range 0–30%, mean 9.4%
Large Rock Cover: range 0–45%, mean 5.6%
Bare Ground: range 1–62%, mean 21.6%
Parent Material: usually igneous or sedimentary, sometimes depositional
Soil Texture: moderately fine sandy or silty clay loam

Vegetation Description:
Stands of the *Bromus diandrus* Herbaceous Association form an open to continuous herbaceous layer (10–90%, mean 38.9%) at 0.01–1 m tall. The shrub layer is sparse to open (0–22%, mean 8.4%) at 0–5 m tall. Trees are infrequently emergent (0–10% cover, mean 1.3%) with hardwoods at 0–15 m tall and conifers at 0–10 m tall. Total vegetation cover is 15–90%, mean cover is 47.9%.

In this association, the herbaceous layer is open to continuous and *Bromus diandrus* is abundant. Other herbs occur at relatively low cover; for example, *Brassica nigra* is often included, and *Hirschfeldia incana* and *Centaurea melitensis* sometimes occur in this layer. The shrub layer occasionally includes *Malosma laurina, Baccharis pilularis, Sambucus mexicana, Ceanothus megacarpus, Salvia mellifera,* and *Heteromeles arbutifolia*. The tree layer infrequently includes *Quercus agrifolia* as an emergent.

***Bromus diandrus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	23	0.4	0.2	3.0			
Shrub									
	MALA6	*Malosma laurina*	50	1.3	0.2	7.0			
	BAPI	*Baccharis pilularis*	32	0.8	0.2	7.0			
	SAME5	*Sambucus mexicana*	32	0.4	0.2	4.0			
	CEME	*Ceanothus megacarpus*	27	0.7	0.2	5.0			
	SAME3	*Salvia mellifera*	27	0.6	0.2	7.0			
	HEAR5	*Heteromeles arbutifolia*	27	0.5	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.6	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	23	0.2	0.2	2.5			
	ARCA11	*Artemisia californica*	23	0.2	0.2	3.0			
Herb									
	BRDI3	*Bromus diandrus*	68	26.4	4.0	90.0	X		X
	BRNI	*Brassica nigra*	55	0.7	0.2	5.0			X
	CEME2	*Centaurea melitensis*	36	1.2	0.2	10.0			X
	BROMU	*Bromus*	32	6.1	10.0	30.0			
	HIIN3	*Hirschfeldia incana*	32	0.7	0.2	5.0			X

Other Noteworthy Species:
Juglans californica was found in 3 of 22 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Avena fatua, Bromus hordeaceus, Carduus pycnocephalus, Melilotus indicus, Erodium cicutarium, Marrubium vulgare, Erodium, Bromus madritensis, Piptatherum miliaceum, Malva parviflora, Nicotiana glauca, Silybum marianum, Vicia sativa, Acacia redolens, Avena barbata, Conium maculatum, Erodium botrys, Eucalyptus, Phalaris aquatica, Anagallis arvensis, Avena, Cirsium vulgare, Cistus, Lactuca serriola, Raphanus sativus, Rosmarinus officinalis, Sonchus oleraceus

Samples Used in Description: (n = 22)
AA0302cc, AA0409, AA0410, AA0810, AA0913, AA0968, rap0038, rap0203, rap0243, rap0371, rap0448, rap0634, rap0759, rap0842, rap1235, rap1319, rap1689, rap2337, rap2523rlv, rap2524rlv, rap2525rlv, rap2893rlv

Comments:
Although this common association of the California annual grassland/herbaceous alliance shares species with the *Brassica nigra* associations of the same alliance, it is overwhelmingly dominated by *Bromus diandrus.* The plots listed without *B. diandrus* in the summary table all have *Bromus* sp. listed (unidentified to species due to poor phenology) and are all likely to be *B. diandrus.* It remains to be seen how environmentally distinct this association is from the other weedy associations in the same alliance (e.g., those with *Brassica nigra*); however, it does seem to favor slightly wetter areas and slightly deeper soils than the *Brassica nigra* Alliance.

Phases:
None

COMMON NAME	Ripgut Brome Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *Bromus diandrus*, an invasive weed with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it has been widely observed (but not sampled) in other parts of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Bromus diandrus-Avena spp. Herbaceous Association

Ripgut Brome-Wild Oat Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50007

Local Description

Summary:
This herbaceous association occurs on gentle to somewhat steep slopes of variable aspect at elevations between 15 and 550 m. *Bromus diandrus* is characteristically present in the herbaceous layer and usually codominates with *Avena fatua* or *A. barbata. Brassica nigra* is also usually found in this layer at low cover. *Hazardia squarrosa, Artemisia californica,* and *Lotus scoparius* are occasionally found in the shrub layer at low cover, and *Quercus lobata* infrequently occurs in the tree layer at low cover.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 15–550 m, mean 293 m
Aspect: variable
Slope: range 2–15 degrees, mean 6.1 degrees
Topography (micro; macro): usually flat or undulating; variable
Litter Cover: range 20–60%, mean 37.5%
Small Rock Cover: range 0–30%, mean 7.2%
Large Rock Cover: range 0–2%, mean 0.3%
Bare Ground: range 1–74%, mean 28.9%
Parent Material: variable but frequently depositional or sedimentary
Soil Texture: variable, but often fine clay

Vegetation Description:
Stands of the *Bromus diandrus-Avena* spp. Herbaceous Association form an open to intermittent herbaceous layer (10–65%, mean 43.9%) at 0.01–1 m tall. The shrub layer is sparse to open (0–9%, mean 2.4%) at 0–5 m tall. Trees are infrequently emergent (0–1% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 13–70%, mean cover is 46.3%.

In this association, the herbaceous layer is open to intermittent, and *Bromus diandrus* is characteristically present and codominant with either *Avena fatua* or *A. barbata. Brassica nigra* is usually included in this layer at low cover while *Bromus madritensis, Bromus hordeaceus*, and *Marrubium vulgare* are occasionally present. Other forbs are occasionally present and sometimes abundant such as *Erodium botrys* and *Centaurea melitensis.* The shrub layer sometimes includes *Hazardia squarrosa, Artemisia californica,* and *Lotus scoparius.* The tree layer infrequently includes *Quercus lobata* as an emergent.

***Bromus diandrus-Avena* spp. Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	50	0.2	0.2	1.0			
	ARCA11	*Artemisia californica*	30	0.7	0.2	5.0			
	LOSC2	*Lotus scoparius*	30	0.4	0.2	3.0			
	BAPI	*Baccharis pilularis*	20	0.4	1.0	3.0			
	SALE3	*Salvia leucophylla*	20	0.01	0.2	0.2			
Herb									
	BRDI3	*Bromus diandrus*	90	9.8	1.0	20.0	X	X	
	AVFA	*Avena fatua*	60	12.1	0.2	51.0			X
	BRNI	*Brassica nigra*	60	0.7	0.2	4.0			X
	AVBA	*Avena barbata*	40	3.3	6.0	12.0			X
	BRMA3	*Bromus madritensis*	40	2.3	0.2	10.0			X
	MAVU	*Marrubium vulgare*	40	0.6	0.2	5.0			X
	BRHO2	*Bromus hordeaceus*	40	0.4	0.2	3.0			X
	ERBO	*Erodium botrys*	30	6.3	3.0	35.0			X
	CEME2	*Centaurea melitensis*	30	1.9	0.2	17.0			X
	MEIN2	*Melilotus indicus*	30	0.2	0.2	1.0			X
	MEPO3	*Medicago polymorpha*	30	0.1	0.2	1.0			X
	FOVU	*Foeniculum vulgare*	30	0.1	0.2	0.2			X
	LEFI11	*Lessingia filaginifolia*	20	0.3	0.2	3.0			
	RASA2	*Raphanus sativus*	20	0.3	0.2	3.0			X
	ANAR	*Anagallis arvensis*	20	0.2	0.2	2.0			X
	HEGR7	*Heterotheca grandiflora*	20	0.2	0.2	2.0			
	HEFA	*Hemizonia fasciculata*	20	0.1	0.2	1.0			
	LUSU3	*Lupinus succulentus*	20	0.1	0.2	1.0			
	AMPS	*Ambrosia psilostachya*	20	0.01	0.2	0.2			
	DICA14	*Dichelostemma capitatum*	20	0.01	0.2	0.2			
	GNAPH	*Gnaphalium*	20	0.01	0.2	0.2			
	GRCA	*Grindelia camporum*	20	0.01	0.2	0.2			
	SOOL	*Sonchus oleraceus*	20	0.01	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Avena fatua, Brassica nigra, Avena barbata, Bromus madritensis, Marrubium vulgare, Bromus hordeaceus, Erodium botrys, Centaurea melitensis, Melilotus indicus, Medicago polymorpha, Foeniculum vulgare, Raphanus sativus, Anagallis arvensis, Sonchus oleraceus, Lolium multiflorum, Avena, Hypochaeris, Cirsium vulgare, Vicia villosa, Euphorbia terracina, Rumex crispus, Silene gallica, Erodium, Erodium cicutarium, Erodium moschatum, Hirschfeldia incana, Malva parviflora, Nicotiana glauca, Sonchus, Sonchus asper, Vicia sativa

Samples Used in Description: (n = 10)
AA1074, rap0324, rap0397m, rap0849, rap0924, rap1328, rap2526rlv, rap2641rlv, rap2790rlv, rap2903rlv

Comments:
Of all the California annual grasslands dominated by nonnative annual grasses, those with *Avena* sp. and mixes of other species tend to have a higher proportion of native annuals. However, this dataset suggests that any given native herbaceous species tend to occur in only 20% or less of the stands.

Phases:
None

COMMON NAME	Ripgut Brome-Wild Oat Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *Avena* sp. and *Bromus diandrus*, both invasive weeds with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Distichlis spicata-Ambrosia chamissonis Herbaceous Association

Salt Grass-Dune Burweed Herbaceous Association
***Distichlis spicata* Herbaceous Alliance**
Salt Grass Herbaceous Alliance

Mapping Code: 4511

Local Description

Summary:
This herbaceous association occurs on flat to somewhat steep, often northeast slopes at low elevations between 0 and 15 m. It is dominated by *Distichlis spicata* in the herbaceous layer, and *Ambrosia chamissonis* is characteristically present as a subdominant. *Atriplex lentiformis*, *Atriplex watsonii*, and *Suaeda taxifolia* are sometimes found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–15 m, mean 4 m
Aspect: variable, but often northeast
Slope: range 0–15 degrees, mean 3.7 degrees
Topography (micro; macro): frequently flat; lower to bottom
Litter Cover: no data
Small Rock Cover: range 0–25%, mean 11%
Large Rock Cover: range 0–1%, mean 0.2%
Bare Ground: range 10–70%, mean 52%
Parent Material: depositional
Soil Texture: sand

Vegetation Description:
Stands of the *Distichlis spicata-Ambrosia chamissonis* Herbaceous Association form a sparse to intermittent herbaceous layer (0–44%, mean 12.1%) at 0.01–1 m tall. The shrub layer is open to intermittent (1–49%, mean 11.7%) at 0.01–2 m tall. Total vegetation cover is 2–55%, mean cover is 23.4%.

In this association, the herbaceous layer is sparse to intermittent and is dominated by *Distichlis spicata*, and *Ambrosia chamissonis* is characteristically present usually as a subdominant. *Cakile maritima, Arundo donax*, and *Carpobrotus edulis* are often included in this layer at low cover. The shrub layer occasionally includes *Atriplex lentiformis*, *Atriplex watsonii*, *Suaeda taxifolia*, and *Coreopsis gigantea* at low cover.

***Distichlis spicata-Ambrosia chamissonis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ATLE	*Atriplex lentiformis*	43	0.5	0.2	2.0			
	SUCA	*Suaeda taxifolia*	29	0.4	1.0	2.0			
	ATWA	*Atriplex watsonii*	29	0.2	0.2	1.0			
	COGI	*Coreopsis gigantea*	29	0.1	0.2	0.2			
Herb									
	AMCH4	*Ambrosia chamissonis*	100	4.5	0.2	16.0		X	
	DISP	*Distichlis spicata*	86	13.2	0.2	43.0	X	X	
	CAMA	*Cakile maritima*	71	0.3	0.2	1.0			X
	ARDO4	*Arundo donax*	57	1.1	0.2	5.0			X
	CAED3	*Carpobrotus edulis*	57	0.2	0.2	1.0			X
	CACH13	*Camissonia cheiranthifolia*	43	0.2	0.2	1.0			
	CYDA	*Cynodon dactylon*	29	0.3	1.0	1.0			X
	ABMA2	*Abronia maritima*	29	0.1	0.2	0.2			
	MASA2	*Malacothrix saxatilis*	29	0.1	0.2	0.2			

Other Noteworthy Species:
Abronia maritima was found in 2 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-2. Global rank is G4?, and state rank is S3?. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Eriogonum crocatum was found in 1 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1. Federal listing is Species of Concern, and state listing is Rare (CNPS 2005, SAMO 2004).

*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 2 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Cakile maritima, Arundo donax, Carpobrotus edulis, Cynodon dactylon, Melilotus, Salsola tragus, Erodium, Foeniculum vulgare, Nicotiana glauca, Osteospermum, Pennisetum setaceum, Tetragonia tetragonioides

Samples Used in Description: (n = 7)
rap0869, rap0871, rap0970, rap0971, rap1199m, rap1271, rap2612

Comments:
Although not sampled anywhere outside of the study area, this association is likely to be relatively rare. However, it is not unusual for the two nominate species to co-occur in coastal settings throughout California where brackish to saline lagoons and other bodies of water exist adjacent to sand flats or dunes.

Phases:
None

COMMON NAME	Salt Grass-Dune Burweed Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.i. Intermittently flooded temperate or subpolar grassland
ALLIANCE	*Distichlis spicata* Herbaceous Alliance (*Distichlis spicata* Tidal Herbaceous Alliance)
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S2

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. Anecdotal observation suggests it may occur northward at least to Marin County in northwest California, where brackish or saline lagoons and other bodies of water exist adjacent to sand flats or dunes (T. Keeler-Wolf personal observation).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Distichlis spicata-Salicornia virginica-Jaumea carnosa Herbaceous Association

Salt Grass-Pickleweed-Marsh Jaumea Herbaceous Association
***Distichlis spicata* Herbaceous Alliance**
Salt Grass Herbaceous Alliance

Mapping Code: 4527

Local Description

Summary:
This herbaceous association occurs on flat to gently sloped ground at low elevations between 0 and 6 m. *Distichlis spicata* and *Jaumea carnosa* are codominant and characteristically present in the herbaceous layer, and *Salicornia virginica* is usually present and subdominant to codominant. *Frankenia salina* is characteristically found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–6 m, mean 3 m
Aspect: flat
Slope: no data
Topography (micro; macro): flat; bottom
Litter Cover: 10% (one sample)
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 60–80%, mean 70%
Parent Material: depositional
Soil Texture: sand to clay

Vegetation Description:
Stands of the *Distichlis spicata-Salicornia virginica-Jaumea carnosa* Herbaceous Association form an open to intermittent herbaceous layer (24–58%, mean 44.6%) at 0.01–0.5 m tall. The shrub layer is sparse to open (0–27%, mean 12.3%) at 0–2 m tall. Total vegetation cover is 51–70%, mean cover is 58.4%.

In this association, the herbaceous layer is open to intermittent, and *Jaumea carnosa* is characteristically present. *Distichlis spicata* and *Salicornia virginica* are also usually present. *Jaumea* and *Distichlis* are codominant, while *Salicornia* is subdominant to codominant. *Cuscuta salina*, *Melilotus indicus*, *Monanthochloe littoralis*, *Rumex crispus*, *Scirpus californicus*, and *Typha* spp. are also occasionally found in this layer at low cover. The shrub layer characteristically includes *Frankenia salina* at low cover, while *Batis maritima, Suaeda taxifolia,* and *Atriplex lentiformis* are also sometimes present.

***Distichlis spicata-Salicornia virginica-Jaumea carnosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	86	2.7	0.2	5.0	X		
	BAMA5	*Batis maritima*	29	2.3	1.0	15.0			
	SUCA	*Suaeda taxifolia*	29	0.9	1.0	5.0			
	ATLE	*Atriplex lentiformis*	29	0.6	1.0	3.0			
Herb									
	JACA4	*Jaumea carnosa*	100	22.3	4.0	55.0	X		
	DISP	*Distichlis spicata*	71	14.6	1.0	43.0			
	SAVI	*Salicornia virginica*	57	9.0	7.0	23.0			
	SALIC	*Salicornia*	43	2.4	3.0	10.0			
	CUSA	*Cuscuta salina*	43	0.6	1.0	2.0			
	MEIN2	*Melilotus indicus*	29	0.7	1.0	4.0		X	
	MOLI	*Monanthochloe littoralis*	29	0.5	0.2	3.0			
	RUCR	*Rumex crispus*	29	0.2	0.2	1.0		X	
	SCCA	*Scirpus californicus*	29	0.1	0.2	0.2			
	TYPHA	*Typha*	29	0.1	0.2	0.2			

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 2 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Melilotus indicus, Rumex crispus, Carpobrotus edulis, Oxalis pes-caprae

Samples Used in Description: (n = 7)
rap0904m, rap1012, rap1023, rap2647, rap2707, rap2772, rap2773

Comments:
The variation in the cover of *Distichlis* and *Salicornia* suggests that this association is perhaps better considered a part of a mixed alliance of *S. virginica* and *D. spicata*. However, at this point we remain conservative and select the *Distichlis spicata* Alliance because of the continuously higher cover of *Distichlis* and other nonwoody herbs such as *Jaumea carnosa*. There are several other plant associations listed for California that contain *D. spicata, J. carnosa,* and *S. virginica*. All have been placed in the *D. spicata* Alliance (e.g., *Distichlis spicata-Frankenia salina-Jaumea carnosa* from Point Reyes and *Jaumea carnosa-Distichlis spicata* from southern California).

This association is the most typical of the "upper" salt marsh associations locally. Its ecological position is typically slightly more elevated and more toward the landward edge of the marsh relative to such associations as the *S. virginica*-Algae and the *Salicornia virginica-Frankenia salina-Suaeda taxifolia* Association. During low tides and in the hot summer months, this association regularly dries out and probably develops higher soil salinity than the adjacent regularly flooded tidal marsh. In some cases field crews were unable to determine the identity of *Salicornia* sp. in the samples, thus listing *Salicornia* sp. with *S. virginica*. Combined, these two taxa occurred in nearly 100% of the samples. Further, the field crews placed *Salicornia* in the shrub layer upon doing species cover and total shrub cover estimates, although many species in

this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
Salicornia virginica-Jaumea carnosa-Distichlis spicata (Pickleweed-Marsh Jaumea-Salt Grass) Phase [4527]
Distichlis spicata-Jaumea carnosa (Salt Grass-Marsh Jaumea) Phase [4514]

COMMON NAME	Salt Grass-Pickleweed-Marsh Jaumea-Herbaceous Association
FORMATION CLASS	V. Herbaceous vegetation
FORMATION SUBCLASS	V.A. Perennial graminoid vegetation
FORMATION GROUP	V.A.5. Temperate or subpolar grassland
FORMATION SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION NAME	V.A.5.N.i. Intermittently flooded temperate or subpolar grassland
ALLIANCE NAME	*Distichlis spicata* Intermittently Flooded Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It appears closely related if not identical to stands defined elsewhere in California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
NatureServe et al. 2003a, Peniado et al. 1994, Zedler 1982

Euphorbia terracina Herbaceous Stands

Geraldton Carnation Weed Herbaceous Stands

Mapping Code: 4771

Local Description

Summary:
Three herbaceous stands occur on gentle to somewhat steep slopes of variable aspect at low elevations between 5 and 48 m. It is dominated by *Euphorbia terracina* in the herbaceous layer, and *Brassica nigra* and *Bromus diandrus* are characteristically present at lower cover. *Ricinus communis* is often found in the shrub layer at low cover, and *Platanus racemosa* is often in the tree layer at low cover.

Distribution:
This vegetation type is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: range 5–48 m, mean 26 m
Aspect: variable
Slope: range 2–22 degrees, mean 9.7 degrees
Topography (micro; macro): variable; most often lower or bottom
Litter Cover: 40%
Small Rock Cover: range 0–10%, mean 5%
Large Rock Cover: no data
Bare Ground: range 20–35%, mean 27.5%
Parent Material: depositional
Soil Texture: moderately fine clay

Vegetation Description:
Stands of *Euphorbia terracina* form an intermittent to continuous herbaceous layer (50–80%, mean 65.3%) at 0.01–2 m tall. The shrub layer is sparse to open (0–1%, mean 0.7%) at 0.01–1 m tall. Trees are often emergent (0–5% cover, mean 2%) with hardwoods at 5–15 m tall. Total vegetation cover is 51–80%, mean cover is 67%.

The herbaceous layer is intermittent to continuous and is dominated by *Euphorbia terracina*, while *Brassica nigra* and *Bromus diandrus* are characteristically present at low cover. *Foeniculum vulgare, Silybum marianum*, and *Hordeum* sp. are usually included in this layer. The shrub layer is sparse and often includes *Ricinus communis*, but other shrubs such as *Myoporum laetum, Artemisia californica, Baccharis pilularis, Encelia californica, Sambucus mexicana*, and Opuntia sp. are sometimes present. The tree layer may include *Platanus racemosa* and may occasionally include *Quercus agrifolia* and *Juglans californica* as emergent trees.

***Euphorbia terracina* Stands**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	67	1.7	0.2	5.0	X		
	QUAG-T	*Quercus agrifolia*	33	0.3	1.0	1.0			
Tree Understory									
	JUCA-M	*Juglans californica*	33	0.1	0.2	0.2			
	QUAG-M	*Quercus agrifolia*	33	0.1	0.2	0.2			
Shrub									
	RICO3	*Ricinus communis*	67	0.1	0.2	0.2			X
	MYLA5	*Myoporum laetum*	33	0.3	1.0	1.0			X
	ARCA11	*Artemisia californica*	33	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	33	0.1	0.2	0.2			
	ENCA	*Encelia californica*	33	0.1	0.2	0.2			
	OPUNT	*Opuntia*	33	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	0.2			
Herb									
	EUTE10	*Euphorbia terracina*	100	56.0	25.0	78.0	X	X	X
	BRNI	*Brassica nigra*	100	5.0	1.0	13.0		X	X
	BRDI3	*Bromus diandrus*	100	0.5	0.2	1.0		X	X
	FOVU	*Foeniculum vulgare*	67	0.1	0.2	0.2			X
	HORDE	*Hordeum*	67	0.1	0.2	0.2			
	SIMA3	*Silybum marianum*	67	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	33	1.7	5.0	5.0			X
	CAED3	*Carpobrotus edulis*	33	1.0	3.0	3.0			X
	MEIN2	*Melilotus indicus*	33	0.7	2.0	2.0			X
	AVENA	*Avena*	33	0.1	0.2	0.2			X
	AVBA	*Avena barbata*	33	0.1	0.2	0.2			X
	BRMAR	*Bromus madritensis* ssp. *rubens*	33	0.1	0.2	0.2			X
	CHAM	*Chenopodium ambrosioides*	33	0.1	0.2	0.2			X
	ERODI	*Erodium*	33	0.1	0.2	0.2			X
	HETE5	*Hesperocnide tenella*	33	0.1	0.2	0.2			
	LOLIU	*Lolium*	33	0.1	0.2	0.2			X
	MAPA5	*Malva parviflora*	33	0.1	0.2	0.2			X
	OXPE	*Oxalis pes-caprae*	33	0.1	0.2	0.2			X
	PACA9	*Papaver californicum*	33	0.1	0.2	0.2			
	PIMI3	*Piptatherum miliaceum*	33	0.1	0.2	0.2			X
	RUUR	*Rubus ursinus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1 of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Euphorbia terracina, Brassica nigra, Bromus diandrus, Foeniculum vulgare, Ricinus communis, Silybum marianum, Bromus madritensis, Carpobrotus edulis, Melilotus indicus, Myoporum

laetum, Avena, Avena barbata, Bromus madritensis ssp. *rubens, Chenopodium ambrosioides, Erodium, Lolium multiflorum, Malva parviflora, Oxalis pes-caprae, Piptatherum miliaceum*

Samples Used in Description: (n = 3)
rap1006, rap1027, rap2535rlv

Comments:
Euphorbia terracina is a dangerously invasive nonnative species, which has taken over several coastal terraces and slopes near Malibu and other coastal areas of the Santa Monica Mountains. It tends to form such dense stands that it excludes other herbaceous species and probably native woody species. It is not considered extensive enough, nor sufficiently regionally established, to be considered an alliance yet.

Phases:
None

COMMON NAME	Geraldton Carnation Weed Stands
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation.
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural perennial forb vegetation
FORMATION	V.B.2.N.a. Tall temperate or subpolar perennial forb vegetation
ALLIANCE	*Euphorbia terracina* Herbaceous Stands
CLASSIFICATION CONFIDENCE LEVEL	3
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, invasive exotic

Global Description

Distribution:
This vegetation is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bossard et al. 2000

Foeniculum vulgare Herbaceous Alliance

Fennel Herbaceous Alliance

Mapping Code: 4760

Local Description

Summary:
This herbaceous alliance occurs on somewhat steep to flat slopes of variable aspect at low elevations between 140 and 178 m. It is dominated by *Foeniculum vulgare* in the herbaceous layer. *Baccharis pilularis* and *Rhus integrifolia* are often found in the shrub layer at low cover, and *Schinus molle* and *Juglans californica* are occasionally present in the tree layer at low cover.

Distribution:
This alliance is sampled in the Dry Inland and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 140–178 m, mean 160 m
Aspect: variable
Slope: range 15–15 degrees, mean 15 degrees
Topography (micro; macro): variable; lower to mid
Litter Cover: range 55–80%, mean 67.5%
Small Rock Cover: range 1–15%, mean 8%
Large Rock Cover: range 0–8%, mean 4%
Bare Ground: range 15–19%, mean 17%
Parent Material: igneous or depositional
Soil Texture: fine clay

Vegetation Description:
Stands of this herbaceous alliance form an open to continuous herbaceous layer (25–69%, mean 37.3%) at 0.5–5 m tall. The shrub layer is sparse to open (0–15%, mean 5.3%) at 0.5–5 m tall. Trees sometimes are emergent (0–2% cover, mean 0.8%) with hardwoods at 0–10 m tall. Total vegetation cover is 30–70%, mean cover is 43.5%.

In this alliance, the herbaceous layer is open to continuous and is dominated by *Foeniculum vulgare. Brassica nigra* and *Carduus pycnocephalus* are occasionally included in this layer. The shrub layer is open and frequently includes *Baccharis pilularis* and *Rhus integrifolia*. Occasionally, *Heteromeles arbutifolia, Malacothamnus fasciculatus, Mimulus aurantiacus,* and *Salvia leucophylla* are present in the shrub layer. The tree layer sometimes includes *Schinus molle* and *Juglans californica* as emergent trees.

Foeniculum vulgare Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SCMO	*Schinus molle*	25	0.6	2.5	2.5			X
	JUCA-T	*Juglans californica*	25	0.3	1.0	1.0			
Tree Understory									
	JUCA-M	*Juglans californica*	25	0.1	0.2	0.2			
	SCMO	*Schinus molle*	25	0.1	0.2	0.2			X
Shrub									
	BAPI	*Baccharis pilularis*	75	0.3	0.2	1.0		X	
	RHIN2	*Rhus integrifolia*	50	1.6	2.5	4.0	X		
	HEAR5	*Heteromeles arbutifolia*	25	0.6	2.5	2.5			
	MAFA	*Malacothamnus fasciculatus*	25	0.6	2.5	2.5			
	MIAU	*Mimulus aurantiacus*	25	0.6	2.5	2.5			
	SALE3	*Salvia leucophylla*	25	0.6	2.5	2.5			
	SAME5	*Sambucus mexicana*	25	0.6	2.5	2.5			
	RICO3	*Ricinus communis*	25	0.3	1.0	1.0			X
	SALA6-M	*Salix lasiolepis*	25	0.1	0.2	0.2			
Herb									
	FOVU	*Foeniculum vulgare*	100	29.4	7.5	68.0	X	X	X
	BRNI	*Brassica nigra*	50	2.3	2.0	7.0			X
	CAPY2	*Carduus pycnocephalus*	50	1.3	0.2	5.0			X
	LECO12	*Leymus condensatus*	25	1.9	7.5	7.5			
	UNHE	Unknown herbs/forbs	25	1.9	7.5	7.5			
	BRDI3	*Bromus diandrus*	25	0.3	1.0	1.0			X
	MASA2	*Malacothrix saxatilis*	25	0.1	0.2	0.2			
	URDI	*Urtica dioica*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 2 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Foeniculum vulgare, Brassica nigra, Carduus pycnocephalus, Schinus molle, Bromus diandrus, Ricinus communis, Schinus molle

Samples Used in Description: (n = 4)
AA0350cc, rap0120m, rap2248, rap2249

Comments:
Common fennel stands are now widespread in coastal central and southern California. They have caused concern on Santa Cruz Island (R. Klinger 1998, personal communication) because of the difficulty of removing them and being replaced by other weedy species. Stands have not been adequately sampled in any part of California to determine individual associations.

Phases:
None

COMMON NAME	Fennel Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural perennial forb vegetation
FORMATION	V.B.2.N.a. Tall temperate or subpolar perennial forb vegetation
ALLIANCE	*Foeniculum vulgare* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, invasive exotic weed

Global Description

Distribution:
This alliance is known from the Santa Monica Mountains region and also from Suisun Marsh in Solano County. However, it commonly occurs in open to continuous stands in the central and south coast ranges and Santa Cruz Island.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bossard et al. 2000, Keeler-Wolf and Vaghti 2000

Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia spp. Herbaceous Association

Alkali Heath-California Sea Lavender-Shore Grass-Pickleweed Herbaceous Association
***Frankenia salina* Herbaceous Alliance**
Alkali Heath Herbaceous Alliance

Mapping Code: 4551

Local Description

Summary:
This herbaceous association occurs on flat ground at low elevations between 1 and 3 m. *Monanthochloe littoralis* and *Distichlis spicata* are characteristically abundant and codominant with *Salicornia virginica* in the herbaceous layer. *Limonium californicum* is characteristically present and subdominant. *Frankenia salina* is characteristically found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 1–3 m, mean 1.8 m
Aspect: flat
Slope: no data
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 10–10%, mean 10%
Parent Material: no data
Soil Texture: fine clay to sand

Vegetation Description:
Stands of the *Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Herbaceous Association form an open to intermittent herbaceous layer (6–60%, mean 43.4%) at 0.01–0.5 m tall. The shrub layer is sparse to intermittent (0–47%, mean 13.2%) at 0–0.5 m tall. Total vegetation cover is 47–75%, mean cover is 56.6%.

In this association, the herbaceous layer is open to intermittent, and *Monanthochloe littoralis* and *Distichlis spicata* are characteristically present and codominant with *Salicornia virginica*. *Limonium californicum* is also characteristically present as a subdominant, and *Jaumea carnosa* is occasionally included in this layer. The shrub layer characteristically includes *Frankenia salina*, and it frequently includes *Suaeda taxifolia* and *Batis maritima*.

***Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	100	17.0	5.0	20.0	X	X	
	SUCA	*Suaeda taxifolia*	80	5.8	3.0	15.0		X	
	BAMA5	*Batis maritima*	80	1.1	0.2	4.0		X	
	ATLE	*Atriplex lentiformis*	40	0.6	0.2	3.0			
	ATRIP	*Atriplex*	20	0.4	2.0	2.0			
	COGI	*Coreopsis gigantea*	20	0.01	0.2	0.2			
	OPLI3	*Opuntia littoralis*	20	0.01	0.2	0.2			
Herb									
	MOLI	*Monanthochloe littoralis*	100	7.9	0.2	22.0	X	X	
	DISP	*Distichlis spicata*	100	7.6	0.2	20.0	X	X	
	LICA5	*Limonium californicum*	100	2.6	0.2	5.0		X	
	SAVI	*Salicornia virginica*	80	10.2	7.0	17.0		X	
	SASU2	*Salicornia subterminalis*	40	2.0	0.2	10.0			
	JACA4	*Jaumea carnosa*	40	1.4	2.0	5.0			
	TRCO4	*Triglochin concinnum*	20	1.0	5.0	5.0			
	SABI	*Salicornia bigelovii*	20	0.2	1.0	1.0			
	CUSA	*Cuscuta salina*	20	0.01	0.2	0.2			

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 4 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 5)
rap0866, rap0867m, rap0879, rap0880, rap0908

Comments:
This association has only been sampled from the study area, but it is likely to occur in other coastal salt marshes of southern California and adjacent Baja California, Mexico. It is closely related to several other coastal salt marsh associations in the *Salicornia virginica* Alliance. Further analysis of more sample data from other areas will be necessary to determine whether this association of the alkali heath alliance should remain a separate entity. The field crews placed *Salicornia* spp. in the shrub layer when doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
None

COMMON NAME Alkali Heath-California Sea Lavender-Shore Grass-Pickleweed Herbaceous Association

SYNONYM None

PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Frankenia salina* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
More northerly stands of the *Frankenia salina* Alliance have been sampled in Suisun Marsh (Solano County, California), but these stands did not have *Limonium californicum* or *Monanthochloe littoralis* associated with them. In general, stands dominated by *Frankenia salina* are less regularly flooded than stands of *Salicornia virginica* and occur on the outer margins of coastal marshes and other saline wetlands.

References:
UCB 2004 Jepson Online Interchange For California Floristics, developed and maintained within the Jepson Flora Project (JFP) at the University of California and Jepson Herbaria (UC/JEPS), University of California, Berkeley (http://ucjeps.berkeley.edu/interchange.html), NatureServe 2005 NatureServe explorer; and an online encyclopedia of life http://www.natureserve.org/explorer/

Juncus effusus Herbaceous Alliance

Common Rush Herbaceous Alliance

Mapping Code: 4330

Local Description

Summary:
One stand of this herbaceous vegetation occurs on a flat surface at low elevation (3 m). It is dominated by *Juncus effusus* in the herbaceous layer, with likely identification as *J. effusus* var. *brunneus* or *J. effusus* var. *pacificus.* Shrub species include *Myoporum laetum* and *Baccharis pilularis.* Emergent tree species include *Washingtonia* (introduced).

Distribution:
This alliance is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: 3 m
Aspect: flat/none
Slope: 0 degrees
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: alluvium/dune
Soil Texture: sand

Vegetation Description:
One stand of the *Juncus effusus* Herbaceous Alliance forms an intermittent herbaceous layer (58%) at 0.5–1 m tall. The shrub layer is open (7%) at 0.5–2 m tall. Emergent trees are sparsely occurring (1%) with mainly hardwoods. Total vegetation cover is 65%.

In this alliance, the herbaceous layer is dominated by *Juncus,* likely *J. effusus* var. *brunneus* or *J. effusus* var. *pacificus.* Other graminoids and forbs occur in this layer at relatively low cover, including nonnative *Carpobrotus edulis.* The shrub layer is open, and *Myoporum laetum* and *Baccharis pilularis* exhibit low cover. The tree layer is sparse and includes *Washingtonia* (introduced).

Juncus effusus Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	WASHI	*Washingtonia*	100	1.0	1.0	1.0	X	X	X
Shrub									
	MYLA5	*Myoporum laetum*	100	4.0	4.0	4.0	X	X	X
	BAPI	*Baccharis pilularis*	100	3.0	3.0	3.0	X	X	
	ARCA11	*Artemisia californica*	100	0.2	0.2	0.2		X	
	ATLE	*Atriplex lentiformis*	100	0.2	0.2	0.2		X	
	BASA4	*Baccharis salicifolia*	100	0.2	0.2	0.2		X	
	NIGL	*Nicotiana glauca*	100	0.2	0.2	0.2		X	X
Herb									
	JUNCU	*Juncus (effusus)*	100	55.0	55.0	55.0	X	X	
	CAED3	*Carpobrotus edulis*	100	1.0	1.0	1.0		X	X
	BRNI	*Brassica nigra*	100	0.2	0.2	0.2		X	X
	CORTA	*Cortaderia*	100	0.2	0.2	0.2		X	X
	PESE3	*Pennisetum setaceum*	100	0.2	0.2	0.2		X	X

Other Noteworthy Species:
None

Nonnative Species:
Myoporum laetum, Carpobrotus edulis, Brassica nigra, Cortaderia, Nicotiana glauca, Pennisetum setaceum

Samples Used in Description: (n = 1)
rap1198m

Comments:
This stand was assessed at a distance with binoculars (stand occurred at a military firing range); thus, more information on species composition is needed to fully characterize this vegetation. This type may occur on a smaller scale on the immediate coast at seeps along or below coastal bluffs.

Phases:
None

COMMON NAME	Rush Herbaceous Stand
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.k. Seasonally flooded temperate or subpolar grassland
ALLIANCE	*Juncus effusus* Herbaceous Stand
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains
CONSERVATION STATUS RANK	G4S4?

Global Description

Distribution:
Stands of various *Juncus* species occur in California including *Juncus mexicanus, J. balticus,* and *J. effusus. Juncus effusus* Alliance is found in most of the southeast states and elsewhere, although the full range in North America is incomplete. It is also found in the Pacific Northwest from British Columbia south to California. A *Juncus effusus* var. *brunneus* Association has been found within a few kilometers of the coast in the vicinity of the Point Reyes National Seashore as well as from the Puget Trough region of Washington and British Columbia. Also, a *J. effusus* Alliance with *J. e. pacificus* has been identified in inland San Diego County.

Nations:
United States, Canada

States or Provinces:
United States: AL, AR, CA, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA, WA and Canada, British Columbia. However, full distribution is not known in North America.

Environmental Description:
In Marin County, *Juncus effusus* var. *brunneus* Association was observed in small stands (under 2 ha.) in seasonally saturated soils within flats, depressions, or gentle slopes of all aspects. Stands prefer basins, bottoms, and plains, which are saturated during the rainy season and usually hold moist soils (sandy loams) most of the growing season. *Juncus effusus* stands are often able to persist in a degraded form in heavily grazed pastures where species associates are largely nonnative. In San Diego County, *Juncus effusus* var. *pacificus* stands occurred as small stands in artificially created stock ponds, riparian features, minor depressions/draws, and wet meadows/seeps. Across the country, J*uncus effusus* has a wide ecological amplitude, and additional alliances with different hydrologies may need to be defined. It is found in marsh habitats that vary greatly in size, situation, geographical location, species composition, and naturalness. Some are beaver-made or human-made impoundments.

Vegetation Description:
This alliance is currently broadly and literally defined, based on dominance by *Juncus effusus.* In Marin County, *Juncus effusus* var. *brunneus* has been found dominant, and other species at low cover may include *Potentilla anserina* var. *pacifica*, *Lolium perenne, Holcus lanatus*, *Trifolium wormskioldii, Trifolium repens*, *Equisetum telmateia braunii, Vicia sp* and/or *Vulpia* sp. In San Diego County, *Juncus effusus* var. *pacificus* was found dominant with *Urtica dioica*, while *Juncus mexicanus* and *Typha latifolia* are present in low cover. *Calocedrus decurrens* or *Salix* spp. are found as emergent trees. Across the country, associated species may include *Andropogon glomeratus, Cyperus* spp., *Typha latifolia, Scirpus cyperinus, Triadenum walteri, Apios americana*, and *Galium aparine*.

Comments:
Identification of the *Juncus* to subspecies is needed within the Santa Monica Mountains region before this alliance can be related to other *Juncus effusus* stands in the state and beyond.

References:
Evens and San 2005, NatureServe 2005, NatureServe et al. 2003a

Lepidium latifolium Herbaceous Association

Broad-Leaved Pepperweed Herbaceous Association
***Lepidium latifolium* Herbaceous Alliance**
Broad-Leaved Pepperweed Herbaceous Alliance

Mapping Code: 4780

Local Description

Summary:
One stand of this herbaceous association occurs on a gentle slope at low elevation (225 m). It is dominated by *Lepidium latifolium* in the herbaceous layer. Other herbs may also be present and are subdominant to low in cover such as *Hirschfeldia incana, Conium maculatum,* and *Bromus madritensis. Baccharis salicifolia* and *B. pilularis* are found in the shrub layer at low cover and, in the single sample, *Fraxinus velutina* and *Quercus lobata* are in the tree layer as sparse emergent trees.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: 225 m
Aspect: variable
Slope: 2 degrees
Topography (micro; macro): undulating; bottom to lower
Litter Cover: 80%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: medium to very fine loamy sand

Vegetation Description:
One stand of *Lepidium latifolium* Herbaceous Association forms an intermittent herbaceous layer (54%) at 0.5–1 m tall. The shrub layer is sparse (1%) at 0–2 m tall. Trees are emergent (< 0.2%) with hardwoods at 5–10 m tall. Total vegetation cover is 63–63%, mean cover is 63%.

In this association, the herbaceous layer is intermittent and is dominated by *Lepidium latifolium. Hirschfeldia incana*, *Bromus madritensis, Conium maculatum*, and *Silybum marianum* are also included in this layer and may be subdominant to low in cover. The shrub layer includes *Baccharis salicifolia* and *B. pilularis* at low cover. The tree layer includes *Fraxinus velutina* and *Quercus lobata* as sparse emergent trees.

***Lepidium latifolium* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	FRVE2	*Fraxinus velutina*	100	0.2	0.2	0.2	X	X	
	QULO-T	*Quercus lobata*	100	0.2	0.2	0.2	X	X	
Shrub									
	BASA4	*Baccharis salicifolia*	100	1.0	1.0	1.0		X	
	BAPI	*Baccharis pilularis*	100	0.2	0.2	0.2		X	
	SAME5	*Sambucus mexicana*	100	0.2	0.2	0.2		X	
Herb									
	HIIN3	*Hirschfeldia incana*	100	18.0	18.0	18.0	X	X	X
	BRMA3	*Bromus madritensis*	100	1.0	1.0	1.0		X	X
	COMA2	*Conium maculatum*	100	1.0	1.0	1.0		X	X
	LEPID	*Lepidium*	100	40.0	40.0	40.0	X	X	
	SIMA3	*Silybum marianum*	100	1.0	1.0	1.0		X	X
	ARDO3	*Artemisia douglasiana*	100	0.2	0.2	0.2		X	
	RUCR	*Rumex crispus*	100	0.2	0.2	0.2		X	X

Other Noteworthy Species:
None

Nonnative Species:
Hirschfeldia incana, Bromus madritensis, Conium maculatum, Silybum marianum, Rumex crispus

Samples Used in Description: (n = 1)
rap2686

Comments:
These stands are made up of the dangerously invasive exotic weed *Lepidium latifolium*, which has proven very difficult to remove. Extensive stands can be found along Madea Creek and Paramount Ranch. These were not sampled because native vegetation is currently being restored and the *Lepidium* eradicated.

Phases:
None

COMMON NAME	Broad-Leaved Pepperweed Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Lepidium latifolium* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, this is an invasive weedy association.

Global Description

Distribution:
This vegetation type has not been identified as an alliance in the National Vegetation Classification System. According to the NRCS PLANTS database (http://plants.usda.gov/), it has been listed as a State Noxious Weed for 43 states.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Associations of *Lepidium latifolium* as well as *Salix gooddingii* and *Baccharis pilularis* alliances with high cover of *Lepidium latifolium* in the understory have been defined from San Diego County. They occur in riparian settings (e.g., San Dieguito River watershed). Other strongly herbaceous-dominated stands of *Lepidium latifolium* have been described from saline and brackish marshes of northern California.

References:
Bossard et al. 2000, Evens and San 2005, Keeler-Wolf and Vaghti 2000

Leymus condensatus Herbaceous Association

Giant Wild Rye Herbaceous Association
***Leymus condensatus* Herbaceous Alliance**
Giant Wild Rye Herbaceous Alliance

Mapping Code: 4041

Local Description

Summary:
This herbaceous association occurs on somewhat steep to steep often northerly slopes at low elevations between 25 and 503 m. It is dominated by *Leymus condensatus* in the herbaceous layer, though sometimes nonnative species can codominate with this native grass. *Salvia leucophylla* is usually found in the shrub layer at low cover, and *Juglans californica, Quercus agrifolia,* and *Sambucus mexicana* infrequently occur in the tree or tall shrub layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 25–503 m, mean 352.1 m
Aspect: variable, but often northwest and northeast
Slope: range 15–38 degrees, mean 30 degrees
Topography (micro; macro): variable; variable, but often lower to mid
Litter Cover: range 25–75%, mean 50%
Small Rock Cover: range 0–15%, mean 6%
Large Rock Cover: range 0–2%, mean 0.5%
Bare Ground: range 5–55%, mean 22%
Parent Material: frequently sedimentary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of the *Leymus condensatus* Herbaceous Association form an open to intermittent herbaceous layer (20–62%, mean 39.7%) at 0.01–2 m tall. The shrub layer is sparse to open though sometimes intermittent (0–35%, mean 8.6%) at 0–5 m tall. Trees are infrequently emergent (0–7% cover, mean 0.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 30–65%, mean cover is 48.8%.

In this association, the herbaceous layer is open to intermittent and is dominated by *Leymus condensatus.* However, nonnative grasses and forbs may be present and subdominant to codominant. For example, nonnative *Brassica nigra* is often included in this layer. Nonnatives *Bromus diandrus* and *Avena fatua* occasionally occur, as does the native forb *Malacothrix saxatilis.* The shrub layer usually includes *Salvia leucophylla* and *Sambucus mexicana, Artemisia californica, Malacothamnus fasciculatus, Hazardia squarrosa,* and *Eriogonum cinereum* are occurring occasionally. The tree layer infrequently includes *Juglans californica, Quercus agrifolia,* and *Sambucus mexicana* as sparse emergent trees.

***Leymus condensatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	67	1.2	0.2	8.0			
	SAME5	*Sambucus mexicana*	50	1.1	0.2	5.0			
	ARCA11	*Artemisia californica*	50	0.5	0.2	4.0			
	MAFA	*Malacothamnus fasciculatus*	33	1.2	0.2	8.0			
	HASQ2	*Hazardia squarrosa*	29	0.4	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	25	0.4	0.2	5.0			
	MALA6	*Malosma laurina*	21	0.7	1.0	7.0			
	TODI	*Toxicodendron diversilobum*	21	0.4	0.2	4.0			
	RHOV	*Rhus ovata*	21	0.1	0.2	1.0			
Herb									
	LECO12	*Leymus condensatus*	100	24.0	6.0	48.0	X	X	
	BRNI	*Brassica nigra*	58	2.6	0.2	12.0			X
	BRDI3	*Bromus diandrus*	38	5.1	3.0	25.0			X
	MASA2	*Malacothrix saxatilis*	29	0.2	0.2	2.0			
	AVFA	*Avena fatua*	25	2.9	1.0	23.0			X
	HIIN3	*Hirschfeldia incana*	21	1.0	0.2	12.0			X
	CEME2	*Centaurea melitensis*	21	0.7	0.2	8.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 2 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Avena fatua, Hirschfeldia incana, Centaurea melitensis, Carduus pycnocephalus, Lactuca serriola, Bromus hordeaceus, Erodium cicutarium, Bromus madritensis, Marrubium vulgare, Nicotiana glauca, Avena, Foeniculum vulgare, Galium aparine, Lolium multiflorum, Melilotus indicus, Silybum marianum, Tropaeolum majus

Samples Used in Description: (n = 24)
AA0316cc, AA1103, AA1113, rap0466m, rap0983, rap1300, rap1316, rap1365, rap1460, rap1461, rap1499, rap1500m, rap1714m, rap1810, rap1816, rap1845, rap1848, rap1890, rap1924, rap1940, rap2006, rap2013m, rap2129, rap2301

Comments:
This association is the first to be defined from this alliance. The alliance and this association tend to be short lived because they are stimulated by fire and are fairly quickly taken over by native shrubs of the coastal sage scrub zone following fire. Keeley 2002 has suggested that *Leymus condensatus* was one of the species whose abundance was maintained by Native American burning. In the SAMO mapping area, *Leymus* does occur after fires; however, it may persist

independently of fire in areas of human disturbance and urban runoff or in areas of coastal sage scrub where natural slumping and seepage occur.

Phases:
None

COMMON NAME	Giant Wild Rye Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.a. Tall sod temperate grassland
ALLIANCE	*Leymus condensatus* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, it is likely to occur sporadically throughout central and southern coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Keeley 2002

Leymus triticoides Herbaceous Alliance

Creeping Wild Rye Herbaceous Alliance

Mapping Code: 4030

Local Description

Summary:
Two stands of this herbaceous alliance occur on gentle to somewhat steep northeast and southeast slopes at low elevations between 224 and 305 m. They are dominated by *Leymus triticoides* in the herbaceous layer. *Baccharis pilularis, Baccharis salicifolia, Hazardia squarrosa,* and *Sambucus mexicana* are found in the shrub layer at low cover.

Distribution:
This association is sampled in the Dry Inland and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 224–305 m, mean 264.5 m
Aspect: northeast and southeast
Slope: range 2–20 degrees, mean 11 degrees
Topography (micro; macro): flat; lower
Litter Cover: range 30–90%, mean 60%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: fine silty clay

Vegetation Description:
Stands of this herbaceous alliance form a continuous herbaceous layer (75-80%, mean 77.5%) at 0.01-0.5 m tall. The shrub layer is sparse at 0-1 m tall. Total vegetation cover is 75-80%, mean cover is 77.5%.

In this alliance, the herbaceous layer is continuous and is dominated by *Leymus triticoides. Lactuca serriola* is frequently included in this layer at low cover. The shrub layer may include *Baccharis pilularis, Baccharis salicifolia, Hazardia squarrosa,* and *Sambucus mexicana* at sparse cover.

Leymus triticoides Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	50	0.1	0.2	0.2			
	BASA4	*Baccharis salicifolia*	50	0.1	0.2	0.2			
	HASQ2	*Hazardia squarrosa*	50	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	50	0.1	0.2	0.2			
Herb									
	LETR5	*Leymus triticoides*	100	71.0	70.0	72.0	X	X	
	LASE	*Lactuca serriola*	100	1.6	0.2	3.0		X	X
	SOOL	*Sonchus oleraceus*	50	5.0	10.0	10.0			X
	ASFA	*Asclepias fascicularis*	50	0.1	0.2	0.2			
	AVFA	*Avena fatua*	50	0.1	0.2	0.2			X
	BRNI	*Brassica nigra*	50	0.1	0.2	0.2			X
	BRCA10	*Bromopsis canadensis*	50	0.1	0.2	0.2			
	BRDI3	*Bromus diandrus*	50	0.1	0.2	0.2			X
	BRHO2	*Bromus hordeaceus*	50	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	50	0.1	0.2	0.2			X
	CAPY2	*Carduus pycnocephalus*	50	0.1	0.2	0.2			X
	CEME2	*Centaurea melitensis*	50	0.1	0.2	0.2			X
	CIVU	*Cirsium vulgare*	50	0.1	0.2	0.2			X
	HIIN3	*Hirschfeldia incana*	50	0.1	0.2	0.2			X
	PHAQ	*Phalaris aquatica*	50	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	50	0.1	0.2	0.2			X
	SIMA3	*Silybum marianum*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Lactuca serriola, Sonchus oleraceus, Avena fatua, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Bromus madritensis, Carduus pycnocephalus, Centaurea melitensis, Cirsium vulgare, Hirschfeldia incana, Phalaris aquatica, Rumex crispus, Silybum marianum

Samples Used in Description: (n = 2)
rap2421, rap2563rlv

Comments:
This alliance appears to be rare and is represented only by a few small stands in the study area. It seems to prefer mesic areas of grasslands in the inland Malibu Creek watershed, especially Las Virgines Canyon.

Phases:
None

COMMON NAME	Beardless Wild Rye Temporarily Flooded Herbaceous Alliance
SYNONYM	Creeping Wild Rye Grassland
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation

PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.j. Temporarily flooded temperate or subpolar grassland
ALLIANCE	*Leymus triticoides* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3

Global Description

Distribution:
This alliance is known from the Santa Monica Mountains as well as other parts of California including the Central Valley, central coast, and south coastal California (Evens and San 2004, Holland 1986, Holstein 2001, Keeler-Wolf and Vaghti 2000). It has been described from Oregon and Nevada as well (NatureServe 2005).

Nations:
United States

States or Provinces:
CA, OR, NV

Environmental Description:
Outside of California, this alliance is described from the Warner Valley of southeastern Oregon and the Cow Creek Basin on northwestern Nevada. Elevations range from 1,250–1,600 m. Climate is arid with mostly winter precipitation ranging from 10–25 cm annually. Stands occur in valleys in drainage bottoms, poorly drained floodplains, and historic lake basins. Sites are typically nearly flat but include moderate slopes (to 18%). It is found on the less xeric northeast and east aspects in Nevada. Soils are typically poorly drained, alkaline, with sandy loam to clay loam texture. The water table is shallow and causes mottles in the soil. Adjacent communities are shrublands dominated by *Artemisia tridentata*. Within California, this alliance occurs at elevations below 1,000 m on flat to moderate slopes of clay or loam soils where the climate is mediterranean (with cool wet winters and warm dry summers and precipitation ranging from 25 to 70 cm). Many stands may be relictual from preagricultural California, and nonnative grasses (or agriculture) probably have replaced many of the native stands. *Leymus triticoides* stands occur in open grassland habitats, drainage bottoms, floodplains, ravines/draws along coastal slopes, and so forth. Adjacent communities include other prairie or grassland habitats and oak savannas.

Vegetation Description:
As described in Oregon and Nevada, this vegetation occurs in bottomlands and lake basins. Stands have a moderate herbaceous layer (50–80% cover) codominated by the perennial graminoids *Elymus triticoides* with *Poa secunda* or *Carex* spp. Other frequent graminoid species include *Distichlis spicata, Hordeum californica, H. jubatum, Juncus balticus,* and forbs such as *Achillea millefolium, Agoseris glauca, Iris missouriensis, Scirpus* spp., *Triglochin maritima* and *Nitrophila occidentalis* in the saline/alkaline playas. In California, stands are equally high in cover and may be dominated by *Leymus triticoides* or codominated with annual grasses. Frequent

species include *Avena fatua, Bromus diandrus, B. hordeaceus, Carduus pycnocephalus, Distichlis spicata, Lactuca serriola, Lolium multiflorum,* and *Vulpia* spp.

Comments:
Stands of this vegetation in California have recently been described by Holstein 2001. This grassland was once much more widespread in the Central Valley prior to the development of low-lying lands for agriculture.

References:
Evens and San 2004, Holland 1986, Holstein 2001, Keeler-Wolf and Vaghti 2000, NatureServe 2005

Lolium multiflorum Herbaceous Association

Italian Ryegrass Herbaceous Association
***Lolium multiflorum* Herbaceous Alliance**
Italian Ryegrass Herbaceous Alliance

Mapping Code: 4210

Local Description

Summary:
This herbaceous association occurs on flat to somewhat steep slopes of variable aspect at elevations between 208 and 270 m. It is dominated by *Lolium multiflorum* in the herbaceous layer. *Baccharis pilularis* is occasionally found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 208–270 m, mean 230.3 m
Aspect: usually flat
Slope: range 0–15 degrees, mean 4.6 degrees
Topography (micro; macro): usually flat or undulating; most often bottom or lower
Litter Cover: range 90–90%, mean 90%
Small Rock Cover: range 0–1%, mean 0.7%
Large Rock Cover: range 0–1%, mean 0.3%
Bare Ground: range 0–10%, mean 5.7%
Parent Material: depositional
Soil Texture: fine clay or silty clay

Vegetation Description:
Stands of the *Lolium multiflorum* Herbaceous Association form an intermittent to continuous herbaceous layer (40–90%, mean 66.4%) at 0.01–1 m tall. The shrub layer is sparse (0–1%, mean < 0.2%) at 0–2 m tall. Total vegetation cover is 40–90%, mean cover is 66.4%.

In this association, the herbaceous layer is dominated intermittently to continuously by *Lolium multiflorum*. A variety of other nonnative species also occur at low cover. For example, *Bromus diandrus* and *Brassica nigra* are often included in this layer, while *Avena fatua, Phalaris aquatica,* and *Bromus hordeaceus* sometimes occur. The shrub layer occasionally includes *Baccharis pilularis* at sparse cover.

***Lolium multiflorum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	43	0.1	0.2	0.2			
Herb									
	LOLIU	*Lolium*	100	55.3	20.0	80.0	X	X	X
	BRDI3	*Bromus diandrus*	71	2.7	0.2	10.0			X
	BRNI	*Brassica nigra*	71	0.6	0.2	2.0			X
	AVFA	*Avena fatua*	43	0.6	0.2	3.0			X
	PHAQ	*Phalaris aquatica*	43	0.3	0.2	2.0			X
	BRHO2	*Bromus hordeaceus*	43	0.2	0.2	1.0			X
	VIVI	*Vicia villosa*	29	1.0	1.0	6.0			X
	BRMA3	*Bromus madritensis*	29	0.6	0.2	4.0			X
	CIVU	*Cirsium vulgare*	29	0.2	0.2	1.0			X
	RASA2	*Raphanus sativus*	29	0.2	0.2	1.0			X
	HEFA	*Hemizonia fasciculata*	29	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Lolium multiflorum, Bromus diandrus, Brassica nigra, Avena fatua, Phalaris aquatica, Bromus hordeaceus, Vicia villosa, Bromus madritensis, Cirsium vulgare, Raphanus sativus, Avena, Hirschfeldia incana, Erodium cicutarium, Phalaris caroliniana, Rumex crispus, Anthemis cotula, Bromus tectorum, Centaurea melitensis, Cynara cardunculus, Lactuca serriola, Malva parviflora, Marrubium vulgare, Medicago polymorpha, Sonchus asper, Sonchus oleraceus

Samples Used in Description: (n = 7)
rap0039, rap0065m, rap0068, rap1426, rap2529rlv, rap2530rlv, rap2849rlv

Comments:
This is a widespread and well-integrated nonnative graminoid vegetation alliance of much of California, and similar if not identical associations may occur throughout much of cismontane California below approximately 1,000 m elevation.

Phases:
None

COMMON NAME	Italian Ryegrass Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Short temperate annual grassland
ALLIANCE	*Lolium multiflorum* Herbaceous Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G5S5—While *Lolium multiflorum* is now established in California as an invasive exotic grass alliance, certain stands may contain sensitive plant species and may have conservation value.

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Although the pure *Lolium multiflorum* Association has been only defined here, it is likely to occur throughout much of cismontane California below approximately 1,000 m elevation in relatively low-lying areas that remain moist through much of the spring. It has only recently been separated from the broader California annual grassland alliance (Evens and San 2004, Evens et al. 2004, Keeler-Wolf and Vaghti 2000, Sawyer and Keeler-Wolf ms 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This alliance is likely to display a variety of associations in California. For example, it has been described on serpentine soils in central California (Santa Clara County), and another type has been defined in the Sierra Nevada foothills (Tuolumne County). Associations are also described from the margins of Suisun Marsh (Solano County).

References:
Evens and San 2004, Evens et al. 2004, Holland 1986, Keeler-Wolf and Vaghti 2000, Reid et al. 1999, Sawyer and Keeler-Wolf MS 2005, Sawyer and Keeler-Wolf 1995

Nassella lepida Herbaceous Alliance

Foothill Needlegrass Herbaceous Alliance

Mapping Code: 4090

Local Description

Summary:
One stand of this herbaceous alliance occurs on a moderately steep, southeast-facing slope at low elevation at 290 m. It is codominated by *Nassella lepida* and *Bromus hordeaceus* in the herbaceous layer. *Malosma laurina, Eriogonum cinereum, Rhus integrifolia,* and *Salvia leucophylla* are found in the shrub layer at low cover.

Distribution:
This alliance is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: 290 m
Aspect: southeast
Slope: 8 degrees
Topography (micro; macro): convex; upper to top
Litter Cover: no data
Small Rock Cover: 20%
Large Rock Cover: no data
Bare Ground: 28%
Parent Material: sedimentary
Soil Texture: no data

Vegetation Description:
One stand of this herbaceous alliance forms an intermittent herbaceous layer (41%) at 0.01–0.5 m tall. The shrub layer is 8% at 0.5–5 m tall. Total vegetation cover is 51%.

In this alliance, the herbaceous layer is intermittent and is codominated by *Nassella lepida* and *Bromus hordeaceus*. The shrub layer includes *Malosma laurina, Eriogonum cinereum, Rhus integrifolia,* and *Salvia leucophylla* at low cover.

Nassella lepida Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	3.0	3.0	3.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	1.0	1.0	1.0		X	
	RHIN2	*Rhus integrifolia*	100	1.0	1.0	1.0		X	
	SALE3	*Salvia leucophylla*	100	1.0	1.0	1.0		X	
	ARCA11	*Artemisia californica*	100	0.2	0.2	0.2		X	
	HASQ2	*Hazardia squarrosa*	100	0.2	0.2	0.2		X	
	MIAU	*Mimulus aurantiacus*	100	0.2	0.2	0.2		X	
	OPLI3	*Opuntia littoralis*	100	0.2	0.2	0.2		X	
	YUWH	*Yucca whipplei*	100	0.2	0.2	0.2		X	
Herb									
	NALE2	*Nassella lepida*	100	30.0	30.0	30.0	X	X	
	BRHO2	*Bromus hordeaceus*	100	13.0	13.0	13.0	X	X	X

Other Noteworthy Species:
None

Nonnative Species:
Bromus hordeaceus

Samples Used in Description: (n = 1)
rap0176

Comments:
Part of the problem in describing this alliance was in the uncertain identification of *Nassella* species (either *pulchra* or *lepida*) due to sampling at nonflowering or fruiting seasons. This alliance appears to occur only rarely in the study area, and it may locally dominate following fire. The species is usually accompanied by relatively high cover of coastal scrub species. Such stands are considered shrublands.

Phases:
None

COMMON NAME	Foothill Needlegrass Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Nassella lepida* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This alliance occurs in northern, central, and southern cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This bunchgrass alliance of California's valleys and foothills grows on deep soils with high clay content, often derived from sandstone or ultramafic parent material. Stands can occur on all topographic positions. However, because of climatic factors, they do not occur in more than 1,700 m elevation. The native California bunchgrasses are adapted to a mediterranean climate with moist, cool winters and long, dry summers. Precipitation varies from 25 and 70 cm per year and falls mostly between November and April. Stands typically include many nonnative annual grasses and herbs.

Vegetation Description:
This native grass forms a medium to tall bunch temperate or subpolar grassland with an open canopy less than 1 m in height. Emergent trees and shrubs may be present. This California native bunchgrass alliance is dominated by *Nassella lepida*. Other graminoids present may include *Festuca californica, Melica californica, Nassella pulchra, Nassella cernua, Calamagrostis koelerioides*, and *Poa secunda*. Many nonnative annuals, such as *Bromus hordeaceus and B. diandrus*, have invaded stands of this alliance. On sites with ultramafic-derived soils, serpentine-adapted species may be present.

Comments:
Stands of this and other central and southern California coastal native grassland alliances may have been maintained by Native American burning (Sawyer and Keeler-Wolf 1995, Keeley 2002).

References:
Sawyer and Keeler-Wolf 1995, Keeley 2002

Nassella pulchra Herbaceous Alliance

Purple Needlegrass Herbaceous Alliance

Mapping Code: 4020

Although most samples of this widespread cismontane California alliance fell into one specific local association that is described in the following text, five samples did not and will be briefly described here. These five stands are found on fine to moderately fine silty clay loam and range from flat to moderately steep slopes. In general, the stands of *Nassella pulchra* grassland are small and are typically associated with shrublands immediately adjacent to them. Unlike *Nassella lepida*, *N. pulchra* does not commonly occur in the understory of coastal scrub communities dominated by *Salvia* spp. or *Artemisia californica*. *Nassella pulchra* does associate with the early seral shrubs, *Baccharis pilularis* and *Hazardia squarrosa,* where these shrubs usually are colonizing grass-dominated stands. The most constant and abundant members of these five stands, aside from *Nassella pulchra*, are *Bromus diandrus* and *Avena fatua*.

This once extensive bunchgrass alliance of California's valleys and foothills grows on deep soils with high clay content (Holland 1986, Sawyer and Keeler-Wolf 1995). Stands can occur on all topographic positions. However, because of climatic factors, they do not occur in more than 1,300 m elevation. The native California and Baja California bunchgrass is adapted to a mediterranean climate with moist, cool winters and long, dry summers. Precipitation varies from 25 to 70 cm per year and falls mostly between November and April. Grazing and fire are important in maintaining the grassland communities, though uncertainty still exists concerning the optimum grazing type and intensity. Stands now typically include many nonnative annual grasses, and reduction in fire frequency has probably favored introduced annual grasses over native perennial bunchgrasses.

This native grass forms a medium to tall bunch temperate or subpolar grassland with an open canopy less than 1 m in height. Emergent trees and shrubs may be present. The alliance is dominated by *Nassella pulchra*, or the native grass cover is at least 10–15% relative to the nonnative grass cover. Other graminoids present may include *Elymus glaucus, Festuca californica, Melica californica, Nassella lepida, N. cernua, Melica imperfecta, Koeleria macrantha*, and *Poa secunda*. Many nonnative annuals, such as *Bromus diandrus, B. madritensis, B. hordeaceus, Avena barbata, A. fatua*, and *Lolium multiflorum*, have invaded stands of this alliance.

Samples classified to the alliance level only: (n = 5)
AA0699, AA1187, rap1121, rap1217, rap1876

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Nassella pulchra-Hazardia squarrosa Herbaceous Association

Purple Needlegrass-Sawtooth Goldenbush Herbaceous Association
***Nassella pulchra* Herbaceous Alliance**
Purple Needlegrass Herbaceous Alliance

Mapping Code: 4021

Local Description

Summary:
This herbaceous association occurs on gentle to steep often northeast or northwest slopes at low elevations between 52 and 422 m. *Nassella pulchra* is characteristically abundant in the herbaceous layer. *Hazardia squarrosa* is characteristically found in the shrub layer at low cover, and *Artemisia californica* is also usually present in this layer.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Dry Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 52–422 m, mean 172 m
Aspect: variable, often northeast or northwest
Slope: range 2–35 degrees, mean 13.4 degrees
Topography (micro; macro): usually flat; variable, but often mid to upper
Litter Cover: range 15–85%, mean 50.3%
Small Rock Cover: range 0–23%, mean 5.8%
Large Rock Cover: no data
Bare Ground: range 2–36%, mean 19.6%
Parent Material: frequently sedimentary
Soil Texture: usually fine to moderately fine clay

Vegetation Description:
Stands of the *Nassella pulchra-Hazardia squarrosa* Herbaceous Association form an open to intermittent herbaceous layer (19–55%, mean 39.5%) at 0.01–1 m tall. The shrub layer is sparse to open (0–13%, mean 5%) at 0.01–2 m tall. Total vegetation cover is 28–58%, mean cover is 44.4%.

In this association, the herbaceous layer is open to intermittent, and *Nassella pulchra* is characteristically abundant. A variety of other herbaceous species occurs, and they may be subdominant. For example, *Avena fatua* is often present, and *Calochortus catalinae*, *Sisyrinchium bellum*, *Hemizonia fasciculate*, *Bromus madritensis*, *Bromus hordeaceus*, *Brassica nigra*, and *Erodium cicutarium* are sometimes found in this layer. The shrub layer characteristically includes *Hazardia squarrosa* and often includes *Artemisia californica* at low cover.

***Nassella pulchra-Hazardia squarrosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	92	2.9	0.2	13.0	X	X	
	ARCA11	*Artemisia californica*	62	1.0	0.2	4.0			
	SALE3	*Salvia leucophylla*	46	0.5	0.2	3.0			
	LOSC2	*Lotus scoparius*	23	0.1	0.2	1.0			
	OPLI3	*Opuntia littoralis*	23	0.1	0.2	1.0			
Herb									
	NAPU4	*Nassella pulchra*	85	21.0	2.0	49.0	X	X	
	AVFA	*Avena fatua*	54	1.3	0.2	10.0			X
	BRMA3	*Bromus madritensis*	46	0.5	0.2	2.0			X
	CACA5	*Calochortus catalinae*	46	0.2	0.2	1.0			
	BRHO2	*Bromus hordeaceus*	38	1.8	1.0	8.0			X
	SIBE	*Sisyrinchium bellum*	38	0.7	0.2	6.0			
	BRNI	*Brassica nigra*	38	0.1	0.2	0.2			X
	ERCI6	*Erodium cicutarium*	38	0.1	0.2	0.2			X
	BRDI3	*Bromus diandrus*	31	1.5	0.2	15.0			X
	HEFA	*Hemizonia fasciculata*	31	0.7	0.2	5.0			
	GRCA	*Grindelia camporum*	31	0.4	0.2	2.0			
	LEFI11	*Lessingia filaginifolia*	31	0.1	0.2	0.2			
	MASA2	*Malacothrix saxatilis*	23	0.4	0.2	4.0			
	ANAR	*Anagallis arvensis*	23	0.3	0.2	3.0			X
	DICA14	*Dichelostemma capitatum*	23	0.2	0.2	1.0			
	SAAR10	*Sanicula arguta*	23	0.1	0.2	1.0			
	FOVU	*Foeniculum vulgare*	23	0.01	0.2	0.2			X
	MEPO3	*Medicago polymorpha*	23	0.01	0.2	0.2			X
	SOOL	*Sonchus oleraceus*	23	0.01	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Dichondra occidentalis was found in 1 of 13 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Dudleya blochmaniae was found in 1 of 13 surveys of this plant community, which may be the rare *Dudleya blochmaniae* subsp. *blochmaniae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-3-2. Global rank is G2T2, and state rank is S2.1. Federal listing is Species of Concern, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Avena fatua, Bromus madritensis, Bromus hordeaceus, Brassica nigra, Erodium cicutarium, Bromus diandrus, Anagallis arvensis, Foeniculum vulgare, Medicago polymorpha, Sonchus

oleraceus, Hirschfeldia incana, Silene gallica, Avena, Avena barbata, Erodium moschatum, Euphorbia terracina, Vicia villosa, Erodium, Galium aparine, Lactuca serriola, Lolium multiflorum, Marrubium vulgare, Melilotus indicus, Phalaris aquatica, Senecio vulgaris, Silybum marianum, Sonchus asper

Samples Used in Description: (n = 13)
AA0481cc, rap0104, rap0922, rap0985, rap1146, rap2012, rap2532rlv, rap2533rlv, rap2534rlv, rap2795, rap2873rlv, rap2913rlv, rap2914rlv

Comments:
This is the most common native grassland in the study area and the primary representative of the widespread *Nassella pulchra* Alliance (Sawyer and Keeler-Wolf 1995). It shows a transitional and seral nature to scrubland by the constant presence of *Hazardia squarrosa*, a common early seral perennial subshrub of coastal southern California. Further, *Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Shrubland Association is also defined in the study area where the shrub layer is more developed. It would be useful to monitor several of these local stands with different fire histories to gain a better understanding of the persistence of this association under different fire regimes and soil types.

Phases:
None

COMMON NAME	Purple Needlegrass-Sawtooth Goldenbush Herbaceous Association
SYNONYM	Valley Needlegrass Grassland (Holland 1986, in part)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Nassella pulchra* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Other associations of this alliance range throughout cismontane California.

Nations:
United States

States or Provinces: CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Pennisetum setaceum Herbaceous Alliance

Fountain Grass Herbaceous Alliance

Mapping Code: 4060

Three samples of this dangerously invasive nonnative alliance were classified to the alliance level only and will be briefly described here. These occurred on steep southerly facing slopes in the eastern urban, immediate coastal, and Simi Hills regions of the park in similar settings to the described *Pennisetum* Association to follow.

The nonnative (African) fountain grass alliance tends to form monospecific stands although it may also have a number of emergent native or nonnative woody species such as *Rhus integrifolia, R. ovata, Artemisia californica, Encelia californica, Eriogonum fasciculatum,* or *E. cinereum* associated with the stands.

This is the first study in which this alliance has been identified in California. However, it is well understood to be commonly occurring as an invasive grassland along sea cliffs and road cuts from San Diego County to Santa Barbara County and has been noted inland as far as Anza-Borrego Desert State Park in San Diego County.

The alliance appears to be dangerously invasive (Bossard et al. 2000) and was initially established as ornamental plantings but has now begun colonizing cliffs and other steep slopes away from direct human disturbance such as road embankments. One association has already been defined in this study of the Santa Monica Mountains.

Samples classified to the alliance level only: (n = 3)
AA0936, rap1272, rap2279

References:
Bossard et al. 2000

Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina Herbaceous Association

Fountain Grass-Giant Coreopsis-Chaparral Yucca Herbaceous Association
***Pennisetum setaceum* Herbaceous Alliance**
Fountain Grass Herbaceous Alliance

Mapping Code: 4061

Local Description

Summary:
This herbaceous association occurs on flat to very steep, often southerly facing slopes at low elevations between 0 and 36 m. It is dominated solely by *Pennisetum setaceum* in the herbaceous layer. *Malosma laurina, Eriogonum cinereum,* and *Yucca whipplei* are characteristically found in the shrub layer at low cover, and *Washingtonia* sp. is infrequently in the tree layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–36 m, mean 12 m
Aspect: variable, but often southeast or southwest
Slope: range 0–60 degrees, mean 40.7 degrees
Topography (micro; macro): undulating or flat; variable, but often bottom to lower
Litter Cover: range 15–15%, mean 15%
Small Rock Cover: range 10–40%, mean 23.3%
Large Rock Cover: range 5–15%, mean 9.7%
Bare Ground: range 15–50%, mean 35%
Parent Material: igneous
Soil Texture: sand (class unknown) or medium loam

Vegetation Description:
Stands of the *Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina* Herbaceous Association form an open to intermittent herbaceous layer (22–40%, mean 32.1%) at 0.01–1 m tall. The shrub layer is open (2–14%, mean 8.9%) at 0.01–5 m tall. Total vegetation cover is 30–49%, mean cover is 40.3%.

In this association, the herbaceous layer is open to intermittent and is dominated solely by *Pennisetum setaceum*. *Brassica nigra, Foeniculum vulgare, Carpobrotus edulis, Bromus madritensis, Malacothrix saxatilis,* and *Medicago polymorpha* are occasionally included in this layer at sparse cover. The shrub layer characteristically includes *Malosma laurina, Eriogonum cinereum,* and *Yucca whipplei* and also usually includes *Salvia mellifera, Coreopsis gigantea*, and *Rhus integrifolia*. The tree layer infrequently includes *Washingtonia* sp. (introduced) as an emergent.

Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina Association

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	2.9	0.2	8.0	X	X	
	ERCI5	*Eriogonum cinereum*	86	1.1	0.2	2.0		X	
	YUWH	*Yucca whipplei*	86	0.9	0.2	3.0		X	
	SAME3	*Salvia mellifera*	71	0.5	0.2	1.0			
	COGI	*Coreopsis gigantea*	71	0.3	0.2	1.0			
	RHIN2	*Rhus integrifolia*	57	1.0	1.0	2.0			
	OPLI3	*Opuntia littoralis*	43	0.3	0.2	2.0			
	ENCA	*Encelia californica*	43	0.2	0.2	1.0			
	BRCA3	*Brickellia californica*	29	0.2	0.2	1.0			
	ISAR	*Isomeris arborea*	29	0.2	0.2	1.0			
	LOSC2	*Lotus scoparius*	29	0.2	0.2	1.0			
	ARCA11	*Artemisia californica*	29	0.1	0.2	0.2			
Herb									
	PESE3	*Pennisetum setaceum*	100	28.4	18.0	40.0	X	X	X
	BRNI	*Brassica nigra*	43	0.1	0.2	0.2			X
	FOVU	*Foeniculum vulgare*	43	0.1	0.2	0.2			X
	CAED3	*Carpobrotus edulis*	29	0.5	0.2	3.0			X
	BRMA3	*Bromus madritensis*	29	0.1	0.2	0.2			X
	MASA2	*Malacothrix saxatilis*	29	0.1	0.2	0.2			
	MEPO3	*Medicago polymorpha*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Pennisetum setaceum, Brassica nigra, Foeniculum vulgare, Carpobrotus edulis, Bromus madritensis, Medicago polymorpha, Melilotus, Avena barbata, Avena fatua, Bromus hordeaceus, Erodium, Euphorbia terracina, Malva parviflora, Melilotus indicus, Nicotiana glauca, Ricinus communis, Sonchus oleraceus

Samples Used in Description: (n = 7)
rap0512, rap0670, rap0882, rap1138, rap1197m, rap1203, rap2897rlv

Comments:
This is the first association defined from this nonnative alliance in California. It is the most typical expression of the alliance in the Santa Monica Mountains, found on steep coastal cliffs, bluffs, and road cuts, immediately adjacent to the Pacific Ocean; it has also been found on sand dunes along the immediate coast. *Pennisetum setaceum* is a dangerously invasive nonnative grass.

Phases:
None

COMMON NAME	Fountain Grass-Giant Coreopsis-Chaparral Yucca Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Pennisetum setaceum* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, this is a nonnative alliance. However, it may have some conservation value if localized or rare native species are associated with it. As this association increases throughout southern California, fewer and fewer natural coastal bluff and cliff communities will remain.

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, it is well understood to be commonly invasive along sea cliffs and road cuts from San Diego County to Santa Barbara County and has been noted inland as far as Anza-Borrego Desert State Park in San Diego County (Bossard et al. 2000). It has escaped from plantings (e.g., San Diego Wild Animal Park) and is now becoming a significant invasive.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bossard et al. 2000

Phalaris aquatica Herbaceous Alliance

Harding Grass Herbaceous Alliance

Mapping Code: 4070

Local Description

Summary:
This herbaceous alliance occurs on flat to moderately steep slopes of variable aspect at low elevations between 188 and 228 m. It is dominated by *Phalaris aquatica* in the herbaceous layer. *Baccharis pilularis* is sometimes found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 188–228 m, mean 205 m
Aspect: variable
Slope: range 0–9 degrees, mean 3.7 degrees
Topography (micro; macro): flat; bottom to lower
Litter Cover: range 55–95%, mean 80%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 0–10%, mean 5%
Parent Material: igneous
Soil Texture: fine to moderately fine sandy or silty clay loam

Vegetation Description:
Stands of this herbaceous alliance form an open to continuous herbaceous layer (25–77%, mean 49%) at 0.1–1 m tall. The shrub layer is sparse to open (0–5%, mean 1.3%) at 0–0.5 m tall. Total vegetation cover is 25–70%, mean cover is 48.7%.

In this alliance, the herbaceous layer is open to continuous and is dominated by *Phalaris aquatica*. *Avena fatua* is occasionally included in this layer, and a variety of other herbs, such as *Bromus diandrus*, *Sisyrinchium bellum*, and *Melilotus indicus,* are infrequently present. The shrub layer occasionally includes *Baccharis pilularis,* and other shrubs may occur infrequently.

Phalaris aquatica Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	33	0.5	0.2	3.0			
Herb									
	PHAQ	*Phalaris aquatica*	100	38.2	18.0	60.0	X	X	X
	AVFA	*Avena fatua*	33	0.4	0.2	2.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Phalaris aquatica, Avena fatua, Bromus diandrus, Melilotus indicus, Bromus hordeaceus, Bromus madritensis, Lolium multiflorum, Anagallis arvensis, Brassica, Euphorbia terracina, Foeniculum vulgare, Picris echioides

Samples Used in Description: (n = 6)
rap0040, rap0052m, rap0085, rap2531rlv, rap2894rlv, rap2895rlv

Comments:
In the Santa Monica Mountains, this vegetation alliance tends to favor moist low areas of grasslands including those with seasonally saturated soil. It seems to be found in areas that had experienced heavy grazing in the past.

Phases:
None

COMMON NAME	Harding Grass Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Phalaris aquatica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains
CONSERVATION STATUS RANK	None, introduced invasive exotic

Global Description

Distribution:
This alliance is not well sampled in California. However, it has been reported from several areas of coastal northern and central California including Colusa/Glen, Marin, Santa Clara, and Solano counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The alliance has been introduced into California, while it is native to the Mediterranean region of Europe. In California, it has been found in inland sites below 800 m in elevation on gentle to moderately steep slopes with a thick layer and high surface cover of litter. Parent material is quite variable including volcanic, Fransciscan, serpentine, and alluvial, and soil is variable from coarse sandy loam to fine silty clay. It has been found in a variety of disturbed habitats including along levees in Suisun Marsh, upper slopes that were converted from chaparral vegetation in the north coast range, disturbed upper grassland slopes in central California, and so forth.

Vegetation Description:
This alliance is defined by *Phalaris aquatica* as the indicator species, with *P. aquatica* dominant or codominant with other nonnative species. One association has been described with *P. aquatica* co-occurring with *Bromus hordeaceus* and *Centaurea solstitialis* from the southern portion of the north coast ranges of California. Other species include annual forbs such as *Clarkia* sp.*, Galium* sp.*, Erodium* sp., *Trifolium dubium,* and *Yabea microcarpa.* A pure association of *P. aquatica* has been defined from Suisun Marsh in small stands along levees. An association of *P. aquatica* dominant to codominant with *Avena barbata* also occurs in the central coast south of San Jose, and characteristic species at low cover include *Lolium multiflorum, Bromus hordeaceus,* and *Erodium* sp. In southern California, *P. aquatica* has been found dominant, and *Avena fatua* was characteristic at low cover.

Comments:
This is aggressively invasive as nonnative grassland forming dense clumps in typically low-lying areas or disturbed areas (Bossard et al. 2000, Evens and San 2004, Jimerson et al. 2000, NatureServe et al. 2003a, Keeler-Wolf and Vaghti 2000). It is favored by frequent fire or clearing, and it appears to colonize and expand in areas formerly dominated by annual grassland, native *Nassella* grassland, or chaparral.

References:
Bossard et al. 2000, Evens and San 2004, Jimerson et al. 2000, NatureServe et al. 2003a, Keeler-Wolf and Vaghti 2000

Salicornia virginica/Algae Herbaceous Association

Pickelweed/Algae Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4528

Local Description

Summary:
This herbaceous association occurs on flat ground at low elevations between 1 and 3 m. It is dominated by algae in the herbaceous layer, and *Salicornia virginica* is characteristically found as a subdominant to codominant.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 1–3 m, mean 2 m
Aspect: flat
Slope: flat
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 40–90%, mean 71.7%
Parent Material: no data
Soil Texture: sand to clay

Vegetation Description:
Stands of the *Salicornia virginica*/Algae Herbaceous Association form an open to intermittent herbaceous layer (15–56%, mean 36.6%) at 0.01–0.5 m tall. The shrub layer is sparse to open (0–8%, mean 1.6%) at 0–0.5 m tall. Total vegetation cover is 15–56%, mean cover is 37.8%.

In this association, the herbaceous layer is open to intermittent and is dominated by algae, while *Salicornia virginica* is characteristically abundant and subdominant to codominant. *Salicornia bigelovii* and *Triglochin concinnum* are infrequently included in this layer at low cover. *Suaeda taxifolia* and *Frankenia salina* are infrequently present at low cover in the shrub layer.

***Salicornia virginica/Algae* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SUCA	*Suaeda taxifolia*	20	0.4	2.0	2.0			
	FRSA	*Frankenia salina*	20	0.01	0.2	0.2			
Herb									
	ALGAE	*Algae*	100	28.0	10.0	50.0	X	X	
	SAVI	*Salicornia virginica*	100	10.8	5.0	30.0	X	X	
	SABI	*Salicornia bigelovii*	20	0.4	2.0	2.0			
	TRCO4	*Triglochin concinnum*	20	0.01	0.2	0.2			

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 5)
rap0865, rap0870, rap0873, rap0875, rap2700

Comments:
This is the more open expression of pickleweed marsh in Mugu Lagoon within the study area and seems to be found in some of the wettest portions of the marsh. It is unclear which species of the algae is (are) present, and it is also unclear how ecologically different this association is from other similar local *Salicornia* associations. There is the possibility that with further detailed analysis of nonvascular flora, this association could be lumped with others of the same alliance. At this point these stands are classified here because of their generally less dense cover of *S. virginica* and the presence of algal mats, which are visible at low tide. The field crews placed *Salicornia* spp. in the shrub layer when doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
None

COMMON NAME	Pickelweed/Algae Herbaceous Association
SYNONYM	Coastal salt and brackish marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to be found on other coastal salt marshes throughout California (Zedler 1982).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Zedler 1982

Salicornia virginica-Brassica nigra Herbaceous Association

Pickleweed-Black Mustard Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4529

Local Description

Summary:
This herbaceous association occurs on flat to gentle slopes of variable aspect at low elevations between 0 and 5 m. *Brassica nigra* is characteristically abundant in the herbaceous layer. *Salicornia virginica* is characteristically abundant in the shrub layer, and *Frankenia salina* is also often present at low cover in this layer.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 0–5 m, mean 2 m
Aspect: frequently flat
Slope: range 0–2 degrees, mean 0.7 degrees
Topography (micro; macro): flat; bottom
Litter Cover: range 65–65%, mean 65%
Small Rock Cover: range 0–1%, mean 0.3%
Large Rock Cover: no data
Bare Ground: range 20–55%, mean 41.7%
Parent Material: no data
Soil Texture: moderately fine sandy to silty clay loam

Vegetation Description:
Stands of the *Salicornia virginica-Brassica nigra* Herbaceous Association form an open to intermittent herbaceous layer (13–42%, mean 29.7%) at 0.01–1 m tall. The shrub layer is sparse to open (0–24%, mean 8.7%) at 0–5 m tall. Total vegetation cover is 30–43%, mean cover is 38.3%.

In this association, the herbaceous layer is open to intermittent with *Salicornia virginica* dominant, and *Brassica nigra* is characteristically subdominant to codominant. *Polypogon monspeliensis*, *Raphanus sativus*, *Carpobrotus edulis, Melilotus albus, Bromus madritensis*, and *Galium aparine* are occasionally included in this layer. *Frankenia salina*, *Atriplex lentiformis, Baccharis pilularis,* and *Myoporum laetum* are often present in the shrub layer and usually at low cover.

***Salicornia virginica-Brassica nigra* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	67	1.0	1.0	3.0			
	ATLE	*Atriplex lentiformis*	50	2.7	0.2	15.0			
	BAPI	*Baccharis pilularis*	50	0.1	0.2	0.2			
	MYLA5	*Myoporum laetum*	50	0.1	0.2	0.2			X
	BASA4	*Baccharis salicifolia*	33	0.2	0.2	1.0			
	OPOR	*Opuntia oricola*	33	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	0.2			
Herb									
	SAVI	*Salicornia virginica*	100	19.8	9.0	35.0	X	X	
	BRNI	*Brassica nigra*	83	6.2	2.0	15.0	X	X	X
	POMO5	*Polypogon monspeliensis*	50	0.8	1.0	2.0			X
	RASA2	*Raphanus sativus*	50	0.1	0.2	0.2			X
	CAED3	*Carpobrotus edulis*	33	4.0	1.0	23.0			X
	UNHE	Unknown herbs/forbs	33	1.2	1.0	6.0			
	UNGR	Unknown annual grass	33	0.8	2.0	3.0			
	MEAL2	*Melilotus albus*	33	0.5	1.0	2.0			X
	MELIL	*Melilotus*	33	0.4	0.2	2.0			X
	MENO2	*Mesembryanthemum nodiflorum*	33	0.2	0.2	1.0			X
	BRMA3	*Bromus madritensis*	33	0.1	0.2	0.2			X
	GAAP2	*Galium aparine*	33	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Brassica nigra, Polypogon monspeliensis, Myoporum laetum, Raphanus sativus, Carpobrotus edulis, Melilotus albus, Melilotus, Mesembryanthemum nodiflorum, Bromus madritensis, Galium aparine, Arundo donax, Bromus diandrus, Bromus hordeaceus, Carpobrotus chilensis, Cotula coronopifolia, Foeniculum vulgare, Marrubium vulgare, Urtica urens

Samples Used in Description: (n = 6)
rap0898, rap0900, rap2710, rap2711, rap2712, rap2778

Comments:
This association represents the local expression of the coastal salt marsh edge, where adjacent weedy herbaceous vegetation borders upon it (Zedler 1982). The marsh edge position of this association is also indicated by the presence of several typically upland shrubby species such as *Atriplex lentiformis, Baccharis pilularis, and Opuntia oricola.* It is likely that such weedy marginal associations occur in other southern California coastal salt marshes and would be recognized with local stand level sampling. The field crews placed *Salicornia* spp. in the shrub layer when doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
None

COMMON NAME	Pickleweed-Black Mustard Herbaceous Association
SYNONYM	Coastal salt and brackish marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL:	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RAN:	G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Zedler 1982

*Salicornia virginica-Frankenia salina-Suaeda taxifolia (*synonym *Suaeda californica* var. *taxifolia)* Herbaceous Association

Pickleweed-Alkali Heath-Sea Blite Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4524

Local Description

Summary:
This herbaceous association occurs on flat to gently sloped ground at low elevations between 0 and 6 m. *Salicornia virginica* is characteristically abundant and dominant in the herbaceous layer, while *Frankenia salina* and *Suaeda taxifolia* are characteristically found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 0–6 m, mean 2 m
Aspect: flat
Slope: 0–2 degrees mean 0.3 degrees
Topography (micro; macro): flat; bottom
Litter Cover: range 30–30%, mean 30%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 20–90%, mean 53.3%
Parent Material: no data
Soil Texture: sand to clay

Vegetation Description:
Stands of the *Salicornia virginica-Frankenia salina-Suaeda taxifolia* Herbaceous Association form an open to intermittent herbaceous layer (1–65%, mean 35.9%) at 0.01–0.5 m tall. The shrub layer is sparse to continuous (0–67%, mean 11.1%) at 0–1 m tall. Total vegetation cover is 13–70%, mean cover is 47%.

In this association, the herbaceous layer is open to intermittent and is dominated by *Salicornia virginica.* It also occasionally contains *Distichlis spicata, Triglochin concinnum*, and *Limonium californicum* at low cover. The shrub layer characteristically includes *Frankenia salina* and *Suaeda taxifolia* at low cover.

***Salicornia virginica-Frankenia salina-Suaeda taxifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	89	5.4	0.2	18.0	X		
	SUCA	*Suaeda taxifolia*	78	1.0	0.2	6.0	X		
	BAMA5	*Batis maritima*	56	3.1	0.2	19.0			
	ATLE	*Atriplex lentiformis*	22	0.01	0.2	0.2			
Herb									
	SAVI	*Salicornia virginica*	100	34.5	1.0	67.0	X		
	DISP	*Distichlis spicata*	39	0.7	0.2	8.0			
	TRCO4	*Triglochin concinnum*	39	0.2	0.2	2.0			
	LICA5	*Limonium californicum*	39	0.1	0.2	0.2			
	ALGAE	*Algae*	28	0.9	0.2	10.0			
	MOLI	*Monanthochloe littoralis*	22	0.5	0.2	7.0			

Other Noteworthy Species:
Abronia maritima was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-2. Global rank is G4?, and state rank is S3?. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 14 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Arundo donax, Bromus madritensis, Melilotus indicus, Brassica, Mesembryanthemum nodiflorum, Myoporum laetum, Rumex crispus, Sonchus

Samples Used in Description: (n = 18)
rap0868, rap0874m, rap0878, rap0881, rap0905, rap0906, rap0909, rap2698, rap2699, rap2701, rap2702, rap2704, rap2705, rap2706, rap2708, rap2774, rap2775, rap2776

Comments:
This association is probably the most extensive of this *Salicornia* Alliance locally. It was found to have significant variability ranging from stands strongly dominated by *S. virginica* to stands with little cover of this species to stands with codominance of the three nominate species. The field crews placed *Salicornia* in the shrub layer upon doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Both *Frankenia salina* and *Suaeda taxifolia* occurred in about 80–90% of the stands averaging 1 to 5% cover, while *Distichlis spicata* occurred in less than 40% of the stands, thus separating this association from the *Distichlis spicata-Salicornia virginica-Jaumea carnosa* Herbaceous Association. It does not contain marsh edge species as does the *S. virginica-Brassica nigra* Association. The presence of *Batis maritima* in > 50% of the samples suggests that this is a core marsh association with less dry periods than those associations with high frequencies of *Distichlis spicata.*

Phases:
Salicornia virginica-Frankenia salina-Batis maritima (Pickleweed-Alkali Heath-Saltwort) Phase [4526]
Salicornia virginica-Suaeda taxifolia (Pickleweed-California Sea Blite) Phase [45201]
Salicornia virginica-Frankenia salina-Suaeda taxifolia (Pickleweed-Alkali Heath-California Sea Blite [Provisional]) Phase [4524]

COMMON NAME	Pickleweed-Alkali Heath-California Sea Blite Herbaceous Association
SYNONYM	Coastal Salt and Brackish Marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in other southern California salt marshes (Zedler 1982).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Zedler 1982

Salicornia virginica-Salicornia subterminalis Herbaceous Association

Pickleweed-Parish's Glasswort Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4525

Local Description

Summary:
This herbaceous association occurs on flat ground at low elevations between 0 and 3 m. *Salicornia subterminalis* and *Salicornia virginica* are characteristically abundant in the herbaceous layer, and *Brassica nigra* is characteristically present at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–3 m, mean 2 m
Aspect: flat
Slope: no data
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 60–60%, mean 60%
Parent Material: no data
Soil Texture: fine to moderately fine silty clay

Vegetation Description:
Stands of the *Salicornia virginica-Salicornia subterminalis* Herbaceous Association form an open herbaceous layer (4–22%, mean 12.3%) at 0.01–0.5 m tall. The shrub layer is sparse to open (0–26%, mean 6.5%) at 0–1 m tall. Total vegetation cover is 10–30%, mean cover is 18.8%.

In this association, the herbaceous layer is open with *Salicornia subterminalis* and *Salicornia virginica* characteristically abundant and codominant. Sometimes *S. subterminalis* can dominate and *S. virginica* subdominate. *Brassica nigra* is characteristically present at low cover, and *Mesembryanthemum nodiflorum* is often present. *Frankenia salina, Batis maritima, Atriplex lentiformis*, and *Suaeda taxifolia* are also occasionally found in the shrub layer.

***Salicornia virginica-Salicornia subterminalis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	50	0.8	0.2	3.0			
	BAMA5	*Batis maritima*	25	1.0	4.0	4.0			
	ATLE	*Atriplex lentiformis*	25	0.1	0.2	0.2			
	SUCA	*Suaeda taxifolia*	25	0.1	0.2	0.2			
Herb									
	SASU2	*Salicornia subterminalis*	100	7.8	4.0	14.0	X	X	
	BRNI	*Brassica nigra*	100	0.4	0.2	1.0		X	X
	SAVI	*Salicornia virginica*	75	6.5	2.0	12.0	X	X	
	MENO2	*Mesembryanthemum nodiflorum*	50	1.0	0.2	4.0			X
	BROMU	*Bromus*	25	0.8	3.0	3.0			
	UNGR	Unknown annual grass	25	0.5	2.0	2.0			
	BRDI3	*Bromus diandrus*	25	0.3	1.0	1.0			X
	MOLI	*Monanthochloe littoralis*	25	0.3	1.0	1.0			
	CACH38	*Carpobrotus chilensis*	25	0.1	0.2	0.2			X
	GAAP2	*Galium aparine*	25	0.1	0.2	0.2			X
	LASE	*Lactuca serriola*	25	0.1	0.2	0.2			X
	MEAL2	*Melilotus albus*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 1 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Mesembryanthemum nodiflorum, Bromus diandrus, Carpobrotus chilensis, Galium aparine, Lactuca serriola, Melilotus albus

Samples Used in Description: (n = 4)
rap0877, rap0901, rap2703, rap2709

Comments:
Crews observed this association in areas where salt deposits accumulate into salt pans. The field crews placed the two *Salicornia* spp. in the shrub layer upon doing species cover and total shrub cover estimates, although these species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

This provisional association is very closely related to the *Salicornia virginica-Brassica nigra* Association, differing only in the higher frequency of the regional salt marsh indicator *Salicornia subterminalis.* However, this association mixed *Salicornia* is also found in the San Dieguito Lagoon, where *Salicornia subterminalis* is subdominant to codominant with *S. virginica.*

Phases:
None. However, this is potentially a phase of the *Salicornia virginica-Brassica nigra* Association.

COMMON NAME	Pickleweed-Parish's Glasswort Herbaceous Association
SYNONYM	Coastal Salt and Brackish Marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association has been found in coastal salt marshes in southern California including Ventura and San Diego counties (Evens and San 2005, Zedler 1982).

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association has been observed in coastal salt marshes with silty clay or silty loam alluvial soils, while being mucky, and where salt deposits have accumulated. They are on flat to gentle bottoms such as lagoons. Litter and fine sediments are the prevalent ground surface.

Vegetation Description:
Salicornia virginica codominates with *Salicornia subterminalis*, while sometimes either *Salicornia* species is subdominant. Other species may occur at low cover including *Frankenia salina, Atriplex lentiformis, Mesembryanthemum* spp., *Carpobrotus chilensis, Bromus diandrus, Distichlis spicata*, and *Isocoma menziesii.*

Comments:
Additional sampling is needed to further verify this association's distribution and variation.

References:
Evens and San 2005, Holland 1986, Zedler 1982

Scirpus acutus-Scirpus californicus Herbaceous Alliance

California Bulrush Herbaceous Alliance

Mapping Code: 4410

Local Description

Summary:
Three stands of this herbaceous alliance occur on flat to gentle slopes at low elevations between 0 and 414 m. *Scirpus californicus* and/or *S. acutus* are characteristically abundant in the herbaceous layer. *Salix lasiolepis* is often found in the shrub layer at low cover.

Distribution:
This alliance is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: range 0–414 m, mean 139.3 m
Aspect: variable to flat
Slope: 0–2 degrees
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 15–15%, mean 15%
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
Stands of this herbaceous alliance form an intermittent to continuous herbaceous layer (48–70%, mean 61%) at 1–5 m tall. Total vegetation cover is 48–70%, mean cover is 61%.

In this alliance, *Scirpus californicus* and/or *S. acutus* may be abundant in the herbaceous layer. In the three stands sampled, *S. californicus* is characteristic and most abundant. Other herbs, such as *Distichlis spicata*, *Juncus* sp., and *Typha* sp., are sometimes present. The shrub layer often includes *Salix lasiolepis*.

Scirpus acutus-S. californicus Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALA6-M	*Salix lasiolepis*	67	0.1	0.2	0.2	X		
Herb									
	SCCA	*Scirpus californicus*	100	44.3	33.0	60.0	X	X	
	SCACO4	*Scirpus acutus* var. *occidentalis*	67	6.7	5.0	15.0			
	CORTA	*Cortaderia*	33	0.3	1.0	1.0			X
	AMPS	*Ambrosia psilostachya*	33	0.1	0.2	0.2			
	CAMA	*Cakile maritima*	33	0.1	0.2	0.2			X
	CYDA	*Cynodon dactylon*	33	0.1	0.2	0.2			X
	DISP	*Distichlis spicata*	33	0.1	0.2	0.2			
	JUNCU	*Juncus*	33	0.1	0.2	0.2			
	LEMNA	*Lemna*	33	0.1	0.2	0.2			
	POAM8	*Polygonum amphibium*	33	0.1	0.2	0.2			
	RUCR	*Rumex crispus*	33	0.1	0.2	0.2			X
	TYPHA	*Typha*	33	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Cortaderia, Cakile maritima, Cynodon dactylon, Rumex crispus

Samples Used in Description: (n = 3)
rap1013, rap2595, rap2614

Comments:
These stands are typically small in the study area, and they occur in perennial wetlands (e.g., lake margins, marshes, stream channels). In some cases, the phenology was not ideal to identify the species of *Scirpus*.

Phases:
None

COMMON NAME	Common Bulrush-California Bulrush Alliance
SYNONYM	*Scirpus acutus-(Scirpus tabernaemontani)* Semipermanently Flooded Herbaceous Alliance
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	V.A.5.N.I. Semipermanently flooded temperate or subpolar grassland
ALLIANCE	*Scirpus acutus-Scirpus californicus* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:

This *Scirpus acutus-S. californicus* Alliance is found in the midwest region (Nebraska, Iowa, South Dakota, North Dakota, and Minnesota), in the western region (California, Oregon, Washington, Idaho, and Montana), and in Canada (British Columbia, southern Manitoba, and northwestern Ontario).

Nations:
United States, Canada, Mexico

States or Provinces:
USA: NE, IA, SD, ND, MN, CA, OR, WA, ID, MT
Canada: BC, southern Manitoba, and northwestern Ontario

Environmental Description:
This relatively widespread alliance occurs on pond and lake margins and in backwater areas. It also occupies basins where the water table may remain relatively high but can drop below the soil surface late in the growing season. Elevations range from sea level in coastal areas to 2,025 m in Montana. Stands of this alliance are flooded for most or all of the growing season. Stands can have water from 0 (exposed soil) to approximately 1.5 m deep but usually are less than 1 m.

Vegetation Description:
Vegetation is characterized by medium to tall graminoids that typically range from 1 to more than 2 m. The vegetation is moderately dense to dense. Some stands are heavily dominated by one or two *Scirpus (S. acutus* or *S. californicus),* while others have several graminoids common throughout the stand. In the United States, the most abundant species are typically *Scirpus acutus*, *S. fluviatilis*, and *S. tabernaemontani*. Species composition and abundance can vary from year to year depending mostly on water level fluctuations. In most years, typical species include *Lemna* spp., *Phragmites australis*, *Scirpus americanus* (in alkaline stands), *Triglochin maritimum* (in alkaline stands), *Typha latifolia*, and *Utricularia macrorhiza*. *Potamogeton* species often occur in the deeper parts of stands of this alliance, where emergent species are not densely packed. Shrubs, such as *Salix* spp., are not common but may become established in shallow water areas. During droughts, species more tolerant of low water, such as *Polygonum amphibium*, may invade and alter the species composition of stands of this alliance.

Comments:
Traditionally, *Scirpus californicus* has not been included as a diagnostic component of this alliance, but in many stands in California both *S. acutus* and *S. californica* co-occur or the two species appear to be ecologically interchangeable, especially in Suisun Marsh and southern California (Evens and San 2005, Keeler-Wolf and Vaghti 2000, Reid et al. 1999, Sawyer and Keeler-Wolf 1995, Weaver 1960).

References:
Evens and San 2005, Keeler-Wolf and Vaghti 2000, Reid et al. 1999, Sawyer and Keeler-Wolf 1995, Weaver 1960

Selaginella bigelovii/Eriogonum fasciculatum Association

Bushy Spike Moss/California Buckwheat Association
***Selaginella bigelovii* Herbaceous Alliance**
Bushy Spike Moss Herbaceous Alliance

Mapping Code: 4811

Local Description

Summary:
This herbaceous association occurs on moderately steep to very steep slopes of variable aspect at low to mid elevations between 81 and 862 m. It is dominated by *Selaginella bigelovii* in the low layer. *Eriogonum fasciculatum* is characteristically abundant in the shrub layer, and *Quercus agrifolia, Schinus molle,* and *Eucalyptus* spp. are infrequently found in the tree layer at low cover.

Distribution:

This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Eastern Urban, Simi Hills Inland, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 81–862 m, mean 464.4 m
Aspect: variable (southwest and northwest most common)
Slope: range 7–55 degrees, mean 29.5 degrees
Topography (micro; macro): variable, but usually undulating; variable
Litter Cover: range 1–20%, mean 7.6%
Small Rock Cover: range 0–75%, mean 22.3%
Large Rock Cover: range 8–95%, mean 44.5%
Bare Ground: range 1–65%, mean 14.3%
Parent Material: often igneous, infrequently sedimentary or depositional
Soil Texture: moderately fine clay loam or sandy clay loam

Vegetation Description:
Stands of the *Selaginella bigelovii/Eriogonum fasciculatum* Association form an open to intermittent cryptogam layer (2–48%, mean 15.5%) at 0.01–1 m tall. The shrub layer is open (1–28%, mean 10.9%) at 0–5 m tall. Trees are infrequently emergent (0–2% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 4–49%, mean cover is 26.1%.

In this association, *Selaginella bigelovii* is characteristically abundant in the cryptogam layer where lichens and mosses are also sometimes found. The herbaceous layer is diverse and can include many native and nonnative species. *Eriogonum fasciculatum* is characteristically common in the shrub layer at low cover. Other shrubs such as *Yucca whipplei, Adenostoma fasciculatum, Artemisia californica, Malosma laurina, Mimulus aurantiacus,* and *Ceanothus crassifolius* are occasionally present at low cover. The tree layer infrequently includes *Quercus agrifolia, Schinus molle,* and *Eucalyptus* spp. as sparse emergent trees.

***Selaginella bigelovii/Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	97	3.7	0.2	10.0	X	X	
	YUWH	*Yucca whipplei*	50	0.5	0.2	5.0			
	ADFA	*Adenostoma fasciculatum*	47	1.0	0.2	5.0			
	ARCA11	*Artemisia californica*	40	0.8	0.2	5.0			
	MALA6	*Malosma laurina*	37	0.4	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	30	0.5	0.2	4.0			
	CECR	*Ceanothus crassifolius*	27	0.6	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	20	0.4	0.2	7.5			
	RHIN2	*Rhus integrifolia*	20	0.4	0.2	3.0			
	ADSP	*Adenostoma sparsifolium*	20	0.3	0.2	4.0			
	LOSC2	*Lotus scoparius*	20	0.3	0.2	4.0			
	SAME3	*Salvia mellifera*	20	0.2	0.2	4.0			
Herb									
	BRMA3	*Bromus madritensis*	33	0.4	0.2	5.0			X
	BRDI3	*Bromus diandrus*	27	0.4	0.2	4.0			X
	AVENA	*Avena*	23	1.0	0.2	15.0			X
	BROMU	*Bromus*	20	0.7	0.2	6.0			
	DULA	*Dudleya lanceolata*	20	0.1	0.2	3.0			
	LEFI11	*Lessingia filaginifolia*	20	0.01	0.2	0.2			
Cryptogam									
	SEBI	*Selaginella bigelovii*	100	7.1	0.2	45.0	X	X	
	LICHEN	*Lichen*	47	1.9	0.2	10.0			
	MOSS	*Moss*	23	0.1	0.2	2.0			

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 30 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Delphinium parryi was found in 1 of 30 surveys of this plant community, which may be the rare *D. parryi* subsp. *blochmaniae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and the CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2. Federal listing is Species of Concern, and state listing is none (CNPS 2005, SAMO 2004).

Eriogonum crocatum was found in 4 of 30 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and the CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1. Federal listing is Species of Concern, and state listing is Rare (CNPS 2005, SAMO 2004).

Leptodactylon californicum was found in 1 of 30 surveys of this plant community, which may be the rare species *L. C.* subsp. *tomentosum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus madritensis, Bromus diandrus, Avena, Bromus hordeaceus, Avena fatua, Avena barbata, Brassica nigra, Erodium cicutarium, Senecio vulgaris, Silene gallica, Centaurea melitensis, Galium aparine, Lolium multiflorum, Schinus molle, Erodium, Carduus pycnocephalus, Eucalyptus, Hypochaeris, Lamarckia aurea, Salsola tragus

Samples Used in Description: (n = 30)
AA0031cc, AA0351cc, AA0434, AA0742cc, AA0747cc, AA0749cc, AA1212, rap0370m, rap0603, rap0605, rap0726, rap0792, rap0793, rap0794m, rap1495, rap1534, rap1618, rap1786, rap2088, rap2222, rap2224, rap2259, rap2287, rap2323, rap2584, rap2652, rap2759, rap2764, rap2765, rap2812

Comments:
This is a characteristic rock outcrop association of both volcanic and sedimentary outcrops in the study area. It typically occurs on relatively gently to moderately sloping slabs of rock and over time may form a thin to moderately thick mat of intertwined roots and rhizomes. These catch soil and dust and build up enough soil to supply substrate for other herbaceous species. The presence of a *Selaginella bigelovii* Alliance has not been identified so far in the national vegetation classification system. These herbaceous stands are visible on outcrops at a distance and often show up as dark mats with emergent drying grass stems and scattered shrubs.

Phases:
None

COMMON NAME	Bushy Spike Moss/California Buckwheat Herbaceous Association
SYNONYM	None
FORMATION CLASS	V. Herbaceous vegetation
FORMATION SUBCLASS	V.B. Perennial forb vegetation
FORMATION GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
FORMATION SUBGROUP	V.B.2.N. Natural/Seminatural temperate or subpolar perennial forb vegetation
FORMATION NAME	V.B.2.N.b. Low temperate or subpolar perennial forb vegetation
ALLIANCE	*Selaginella bigelovii* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3

Global Description

Distribution:
It is likely that this association and *Selaginella bigelovii* Alliance will prove to be fairly widespread in southern California along expansive rocky substrates including on some of the offshore islands. For example, sampling in inland San Diego County represented one stand of this *Selaginella bigelovii/Eriogonum fasciculatum* Association on south-facing granitoid rocky slopes. Further anecdotal observation suggests that this association may occur in several places in coastal southern California such as the Santa Susana Mountains and the San Gabriel Mountains.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association is characteristically found on exposed rock outcrops that are usually somewhat steep to steep slopes of igneous or sedimentary parent material.

Vegetation Description:
Stands contain *Selaginella bigelovii* usually as dominant at more than 10% cover. Other cryptogams may be present such as moss and lichen. The herbaceous layer is diverse and can include many native and nonnative species including *Dudleya* spp., *Lessingia filaginifolia, Phacelia* spp., *Bromus madritensis,* and *Avena* spp. Low woody shrubs and subshrubs are present (usually well under 10% cover) but lower in cover than the average *Selaginella* cover. *Eriogonum fasciculatum* is characteristically common in the shrub layer at low cover. Other shrubs may include *Yucca whipplei, Artemisia californica,* and *Adenostoma fasciculatum.*

Comments:
Other *Selaginella* alliances (e.g., *S. Selaginella [tortipila, rupestris]* Alliance*; Sedum nuttallianum* Sparsely Vegetated Alliance) are known from the national vegetation classification (NatureServe 2005). However, the *S. bigelovii* Alliance is the first to be described from California (Evens and San 2005).

References:
Evens and San 2005, NatureServe 2005

Typha sp. Herbaceous Alliance

Cattail Herbaceous Alliance

Mapping Code: 4420

Local Description

Summary:
One stand of this alliance occurs on relatively flat land at low elevation, in wetland habitats such as pond margins and coastal lagoons. It is dominated by *Typha* sp. in the herbaceous layer and has no shrubs or trees.

Distribution:
This association is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: no data
Aspect: flat
Slope: 2 degrees
Topography (micro; macro): flat; bottom
Litter Cover 80%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
One stand of this herbaceous alliance forms an intermittent herbaceous layer (60%) at 0.5–1 m tall. Total vegetation cover is 60%.

In this stand, the herbaceous layer is intermittent and dominated by *Typha*. *Scirpus californicus*, *Cakile maritime,* and *Distichlis spicata* are also included in this layer at relatively low cover.

***Typha* sp. Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Herb									
	TYPHA	*Typha*	100	55.0	55.0	55.0	X	X	
	SCCA	*Scirpus californicus*	100	3.0	3.0	3.0		X	
	CAMA	*Cakile maritima*	100	0.2	0.2	0.2		X	X
	CORTA	*Cortaderia*	100	0.2	0.2	0.2		X	X
	DISP	*Distichlis spicata*	100	0.2	0.2	0.2		X	
	RUCR	*Rumex crispus*	100	0.2	0.2	0.2		X	X

Other Noteworthy Species:
None

Nonnative Species:
Cakile maritima, Cortaderia, Rumex crispus

Samples Used in Description: (n = 1)
rap2615

Comments:
Typha stands are uncommon in small and local stands within the study area. They may occur in ponds, slow moving stretches of creeks, or along borders of coastal lagoons.

Phases:
None

COMMON NAME	Cattail Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.I. Semipermanently flooded temperate or subpolar grassland
ALLIANCE	*Typha* sp. Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This alliance is found at low to moderate elevations in virtually every state in the United States and probably most Canadian provinces.

Nations:
United States, Canada, Mexico

States or Provinces:
virtually all states and provinces in North America

Environmental Description:
This alliance is found most commonly along lake or pond margins, by slow-moving ditches, in shallow basins, adjacent to stream or river channels, in wet mud, in oxbows, and occasionally in river backwaters. Elevations range from near sea level to around 2,000 m in Colorado. Sites where this alliance occur are typically semipermanently flooded, inundated with 30 to 100 cm of water throughout the year. Lacustrine cattail marshes typically have a muck-bottom zone bordering the shoreline, where cattails are rooted in the bottom substrate and a floating mat zone where the roots grow suspended in a buoyant peaty mat. *Typha angustifolia* can grow in deeper water compared to *Typha latifolia*, although both species reach maximum growth at a water depth of 50 cm.

Vegetation Description:
Vegetation is characterized by *Typha* as the main dominant species including *T. angustifolia, T. latifolia,* and/or *T. domingensis* (Hansen et al. 1995, Reid et al. 1999, Sawyer and Keeler-Wolf

1995). Other wetland graminoids or forb species may be present at low cover including *Cyperus* sp., *Scirpus californicus,* and *Rumex* sp. *Typha* species are prolific seed producers, spreading rapidly to become the early colonizers of wet mineral soil, and will persist under wet conditions. Roots and lower stems are well adapted to prolonged submergence, but periods of drawdown are required for seed germination to occur.

Comments:
None

References:
Hansen et al. 1995, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

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Appendix E

VEGETATION SAMPLING PROTOCOLS AND FIELD FORMS

APPENDIX 1. Vegetation Sampling Protocols and Field Forms

CALIFORNIA NATIVE PLANT SOCIETY –
VEGETATION RAPID ASSESSMENT PROTOCOL
CNPS VEGETATION COMMITTEE
(November 5, 2001, Revised SAMO July 23, 2002)

Introduction

The rapid assessment protocol is a reconnaissance-level method of vegetation and habitat sampling. It may be used to quickly assess and map the extent of all vegetation types in relatively large, ecologically defined regions. The California Native Plant Society (CNPS) has adopted this method to verify locations of known vegetation types, to gain information about new types, and to acquire general information about their composition, habitat, and site quality. Other agencies, such as California State Parks and the U.S. Forest Service, are also adopting this method for documenting vegetation patterns.

By using this method, biologists and resource managers can gain a broad ecological perspective, as the full range in ecological variation across broad landscapes can be reflected in the vegetation assessments. For example, changes in environmental elements (such as geology, aspect, topographic position) or physical processes (fire, flooding, erosion, and other natural or human-made disturbances) can influence the distribution of plants or patterning of vegetation, which are documented in the rapid assessments. In turn, these vegetation patterns can influence the distribution of animals across the landscape.

The quantitative vegetation data recorded in the rapid assessments can be described with standard classification techniques and descriptions, and they can be depicted in maps across any landscape. Additional information recorded in the assessments, such as disturbance history and anthropogenic impacts, can serve to define habitat quality and integrity for plant and animal distributions. Because this method provides an important means for representing the full array of biological diversity as well as habitat integrity in an area, it can also be an effective and efficient tool for conducting natural resource planning.

Purpose

The Vegetation Program has adopted the rapid assessment method to update the location, distribution, species composition, and disturbance information of vegetation types as identified in the first edition of *A Manual of California Vegetation* (MCV), a CNPS publication. The release of the MCV heralded a new statewide perspective on vegetation classification. The premise of the book – all vegetation can be quantified based on cover, constancy, and composition of plant species, yielding uniform defensible definitions of vegetation units – has proven to be very useful throughout California and the rest of the nation. The MCV has become the standard reference on California vegetation and has been adopted by many agencies such as

California Department of Fish and Game, the National Park Service, and the U.S. Forest Service as the standard approach to classify vegetation statewide.

One of the most important purposes of rapid assessments is to verify the locations of each vegetation type because much about the geography of vegetation remains uncertain in this state. To obtain a more accurate understanding of the location and distribution of the vegetation types, nothing short of systematic inventory will suffice. Using the rapid assessment method, CNPS Chapters and other organizations can work together in selected ecological regions to gather vegetation data over a short time period in a broad area. This geographic inventory of vegetation types can greatly advance the current distribution understanding of vegetation.

In addition, California is working with a new vegetation classification, and its parameters are largely untested. The rapid assessment method will be used to gather additional information on species composition, distribution, disturbance effects, and environmental influences of vegetation. Thus, this method will provide modifications to the existing vegetation classifications and information on new types.

This protocol can also be used in tandem with other resource assessment protocols such as California Wildlife Habitat Relationships (CWHR) protocols to obtain detailed records on habitat quality and suitability for vertebrate animals in any terrestrial habitat. The CWHR protocols can also help test the relationships between the vegetation type and habitat of various animals and thereby refine the understanding and predictability of the distribution of animals. A portion of the CWHR protocols is incorporated into the rapid assessment method to obtain suitability information for vertebrate species.

While people can quickly obtain information on the variety of vegetation types using this method, some of the vegetation types recorded in the rapid assessment process may be poorly defined in the current classification system. These poorly understood or unknown types will be identified and located and then will be prioritized for more detailed assessment using the CNPS relevé protocol. Thus, the rapid assessment method will be used in conjunction with the relevé method to provide large quantities of valuable data on the distribution and the definition of vegetation. These data will be entered into existing databases for summarizing and archiving, and they will be used to modify and improve statewide vegetation classification and conservation information.

<u>Why do we need to know about the composition and distribution of vegetation?</u>

- to have a more accurate understanding of the commonness and rarity of different forms of vegetation throughout the state
- to link the distribution of various rare and threatened plant species with the vegetation units
- to provide a clearer picture of relationships between vegetation types
- to help prioritize community-based land conservation goals based on the local representation of unique types, high diversity areas, etc.

- to do the same for regional vegetation throughout the state and the nation.
- to broaden the vegetation knowledge base for California
- to motivate people to do more to help identify, protect, and conserve vegetation in their area
- to link vegetation types with habitat for animals

Selecting stands to sample:

To start the rapid assessment method, stands of vegetation needs to be defined.
A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as alpine meadow or tundra types, and some may be several square kilometers in size, such as desert or forest types. A stand is defined by two main unifying characteristics:

1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct.
2) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, a sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous.

Stands to be sampled may be selected by evaluation prior to a site visit (*e.g.* delineated from aerial photos or satellite images), or they may be selected on site (during reconnaissance to determine extent and boundaries, location of other similar stands, etc.).

Depending on the project goals, you may want to select just one or a few representative stands of each homogeneous vegetation type for sampling (*e.g.* for developing a classification for a vegetation mapping project), or you may want to sample all of them (*e.g.* to define a rare vegetation type and/or compare site quality between the few remaining stands).

Definitions of fields in the protocol

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling. It is usually denoted with an abbreviation of the sampling location and then a sequential number of that locale (*e.g.* CRRA-001 for Coyote Ridge rapid assessment number 1).

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photointerpreters have already done photointerpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank.

Date: Date of the sampling.

Name(s) of surveyors: The full names of each person assisting should be provided for the first rapid assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

GPS waypoint #: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS name: The name personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (NAD 27) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects is NAD 27. However, other agencies and organizations may prefer another datum. Please circle NAD27 or write in the appropriate datum.

Is GPS within stand? Yes / No Circle "Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand).

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g.* binoculars, aerial photo).

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location, because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record using a GPS unit or USGS topographic map.

UTM zone: Universal Transverse Mercator zone. Zone 10S for California west of the 120th longitude; zone 11S for California east of 120th longitude.

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

Photograph #'s: Note the roll number, frame number, direction, and the name of the person whose camera is being used. Take at least two photographs from different directions, and describe the location and view direction from compass bearings for each frame. Additional photographs of the stand may also be helpful. (Also, if using a digital camera or scanning the image into a computer, positions relative to the polygon/stand number can be recorded digitally.)

Topography: Check two of the provided features, characterizing both the local relief and the broad topographic position of the area. First assess the minor topographic features or the lay of the area (*e.g.* surface is flat, concave, etc.). Then assess the broad topographic feature or general position of the area (*e.g.* stand is at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top).

Geology: Geological parent material of site. If exact type is unknown, use a more general category (*e.g.* igneous, metamorphic, sedimentary). *See code list for types.*

Soil: Record soil texture or series that is characteristic of the site (*e.g.* sand, silt, clay, coarse loamy sand, sandy clay loam, saline, et.). *See soil texture key and code list for types.*

% Large Rock (optional): Estimate the percent surface cover of large rocks (e.g. stones, boulders, bedrock) that are beyond 25 cm in size.

% Small Rock (optional): Estimate the percent surface cover of small rocks (e.g. gravel, cobbles) that are greater than 2 mm and less than 25 cm in size.

% Bare/Fines (optional): Estimate the percent surface cover of bare ground and fine sediment (e.g. dirt) that is 2 mm or less in size.

General slope exposure (circle one and enter actual º): Read degree aspect from a compass or clinometer (or estimate). Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

General slope steepness (circle one and enter actual º): Read degree slope from compass (or estimate), using degrees from true north (adjusting for declination). Average the reading over entire stand.

Upland or Wetland (circle one) Indicate if the stand is in an upland or a wetland; note that a site need not be officially delineated as a wetland to qualify as such in this context (*e.g.* seasonally wet meadow).

Site history, stand age, and comments: Briefly describe the stand age/seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

Type / level of disturbance (use codes): List codes for potential or existing impacts on the stability of the plant community. Characterize each impact each as L (=Light), M (=Moderate), or H (=Heavy). *See code list for impacts.*

VEGETATION DESCRIPTION

Basic alliance and stand description.

Field-assessed vegetation alliance name: Name of alliance (series) or habitat following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g. Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Please note: The field-assessed alliance name may not exist in present classification, in which you can provide a new alliance name in this field. If this is the case, also make sure to denote and explain this in the "Cannot identify alliance based on MCV classification" of the "**Problems with Interpretation**" section below.

Field-assessed association name (optional): Name of the species in the alliance and additional dominant/diagnostic species from any strata, as according to CNPS classification. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (*e.g. Quercus agrifolia/Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (*e.g. Quercus agrifolia-Quercus kelloggii)*.

Please note: The field-assessed association name may not exist in present classification, in which you can provide a new association name in this field.

Size of stand: Estimate the size of the entire stand in which the rapid assessment is taken. As a measure, one acre is about 0.4 hectares or about 4000 square meters.

Number of encounters of this alliance (tally/circle once): This estimate can be done for a landscape-level project of a general area, ecological subsection, watershed, etc., though it is not required. Make an estimate of the total number of times that this alliance was seen in the project survey and recorded on field forms.

Please note: This estimation should only be done once, at the end of a project survey, for every alliance identified in the field. Please provide the tally once for each alliance, and provide the estimate on the first rapid assessment field form that was filled out for each alliance.

Habitat classification per California Wildlife-Habitat Relationships (CWHR)
For CWHR, identify the size/height class of the stand using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

Tree: Circle one of the tree size classes provided when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Size class is based on the average dbh (diameter of trunk at breast height). In choosing a size class, make sure to estimate the mean diameter of all trees over the entire stand. Circle the size class 6 multi-layered tree if there is a size class 5 of trees over a distinct layer of size class either 3 or 4 (*i.e.,* distinct height class separation between different tree species) and the total tree canopy exceeds 60%.

If tree, list 1-3 dominant overstory species: If tree canopy cover exceeds 10 percent (except in desert types), please list the dominant species that occur in the overstory canopy.

Shrub: Circle one of the shrub size classes provided when shrub canopy closure exceeds 10 percent (except in desert types). Size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

Herbaceous: Circle one of the herb height classes provided when herbaceous cover exceeds 2 percent. This height class is based on the average plant height at maturity.

Desert Palm/Joshua Tree: Circle one of the palm or Joshua tree size classes by averaging all the stem-base diameters (*i.e.,* mean diameter of all stem-base sizes). Diameter is measured at the plant's base above the bulge near the ground.

Desert Riparian Tree/Shrub: Circle one of the size classes by measuring mean stem height (whether tree and/or shrub stand).

Overall cover of vegetation
Provide an ocular estimate of cover for the following categories (based on functional life forms). Record a specific number for the total aerial cover or "bird's-eye view" looking from above for each category, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

To come up with a specific number estimate for percent cover, first use to the following CWHR cover intervals as a reference aid to get a generalized cover estimate: <2%, 2-9%, 10-24%, 25-39%, 40-59%, 60-100%. While keeping these intervals in mind, you can then refine your estimate to a specific percentage for each category below.

%Overstory Conifer/Hardwood Tree cover: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Shrub cover: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs.

Ground cover: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs.

Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers.

Modal height for conifer/hardwood tree, shrub, and herbaceous categories *(optional)*
If height values are important in your vegetation survey project, provide an ocular estimate of height for each category listed. Record an average height value, estimating the modal height for each group. Use the following height intervals and record a height class: 01=<1/2m, 02=1/2-1m, 03=1-2m, 04=2-5m, 05=5-10m, 06=10-15m, 07=15-20m, 08=20-35m, 09=35-50m, 10=>50m.

SPECIES LIST AND COVERAGE

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

List the species that are dominant or that are characteristically consistent throughout the stand.

When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per

stratum. Provide a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height.

Also, provide a numerical ocular estimate of aerial coverage for each species. When estimating, it is often helpful to think of coverage in terms of the cover intervals from the CNPS relevé form at first (*e.g.* <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%). Keeping these classes in mind, then refine your estimate to a specific percentage (*e.g* the cover of species "x" is somewhere between 25 and 50 percent, but I think it is actually around 30%). Please note: All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Major nonnative species in stand (with % cover): All exotic species occurring in the stand should be listed in this space provided (or they can be recorded in the above Species list). Make sure to give each exotic species an absolute coverage estimate.

Unusual species: List species that are either locally or regionally rare, endangered, or atypical (*e.g.* range extension or range limit) within the stand. This species list will be useful to the Program for obtaining data on regionally or locally significant populations of plants.

PROBLEMS WITH INTERPRETATION

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this alliance name. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Cannot identify alliance based on MCV classification? (Check if appropriate) and Explain: If the field-assessed alliance name is not defined by CNPS's present Manual of California Vegetation (MCV) classification, note this in the space and describe why. In some instances for specific projects, there may be the benefit of more detailed classifications than what is presented in the first edition of the MCV. If this is the case, be sure to substitute the most appropriate and detailed classification.

Other identification problems (describe): Discuss any further problems with the identification of the assessment (*e.g.* stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

Polygon is more than one type (Yes, No) (Note: type with greatest coverage in polygon should be entered in above section) This is relevant to areas that have been delineated as polygons on aerial photographs for a vegetation-mapping project. In most cases the polygon delineated is intended to represent a single stand, however mapping conventions and the constraints and interpretability of remote images will alter the ability to map actual stands on the

ground. "Yes" is noted when the polygon delineated contains the field-assessed alliance and other vegetation type(s), as based on species composition and structure. "No" is noted when the polygon is primarily representative of the field-assessed alliance.

Other types: If "Yes" above, then list the other subordinate vegetation alliances that are included within the polygon. List them in order of their amount of the polygon covered.

Has the vegetation changed since air photo taken? (Yes, No) If an aerial photograph is being used for reference, evaluate if the stand of the field-assessed alliance has changed as a result of disturbance or other historic change since the photograph was taken.

If Yes, how? What has changed (write N/A if so)**?** If the photographic signature of the vegetation has changed (*e.g.* in structure, density, or extent), please detail here.

Simplified Key to Soil Texture (Brewer and McCann, 1982)

Place about three teaspoons of soil in the palm of your hand. Take out any particles >2mm in size, and use the following key to figure out the soil texture (e.g. loamy sand). Then figure out the texture subclass by using the Code List attached (e.g. coarse loamy sand).

A1 Soil does not remain in a ball when squeezed.....sand

A2 Soil remains in a ball when squeezed..... B

B1 Add a small amount of water. Squeeze the ball between your thumb and forefinger, attempting to make a ribbon that you push up over your finger. Soil makes no ribbon.....loamy sand

B2 Soil makes a ribbon; may be very short.....C

C1 Ribbon extends less than 1 inch before breaking.....D

C2 Ribbon extends 1 inch or more before breaking.....E

D1 Add excess water to small amount of soil; soil feels very gritty or at least slightly gritty .....loam or sandy loam

D2 Soil feels smooth.....silt loam

E1 Soil makes a ribbon that breaks when 1–2 inches long; cracks if bent into a ring.....F

E2 Soil makes a ribbon 2+ inches long; does not crack when bent into a ring.....G

F1 Add excess water to small amount of soil; soil feels very gritty or at least slightly gritty.....sandy clay loam or clay loam

F2 Soil feels smooth.....silty clay loam or silt

G1 Add excess water to a small amount of soil; soil feels gritty or at least slightly gritty.....sandy clay or clay

G2 Soil feels smooth.....silty clay

CALIFORNIA NATIVE PLANT SOCIETY RELEVÉ FIELD FORM CODE LIST

(revised 7/8/02)

MACRO TOPOGRAPHY

00 Bench
01 Ridge top (interfluve)
02 Upper 1/3 of slope
03 Middle 1/3 of slope
04 Lower 1/3 of slope (lowslope)
05 Toeslope (alluvial fan/bajada)
06 Bottom/plain
07 Basin/wetland
08 Draw
09 Other
10 Terrace (former shoreline or floodplain)
11 Entire slope
12 Wash (channel bed)
13 Badland (complex of draws & interfluves)
14 Mesa/plateau
15 Dune/sandfield
16 Pediment
17 Backslope (cliff)

MICRO TOPOGRAPHY

01 Convex or rounded
02 Linear or even
03 Concave or depression
04 Undulating pattern
05 Hummock or Swale pattern
06 Mounded
07 Other

IMPACTS

01 Development
02 ORV activity
03 Agriculture
04 Grazing
05 Competition from exotics
06 Logging
07 Insufficient population/stand size
08 Altered flood/tidal regime
09 Mining
10 Hybridization
11 Groundwater pumping
12 Dam/inundation
13 Other
14 Surface water diversion
15 Road/trail construction/maint.
16 Biocides
17 Pollution
18 Unknown
19 Vandalism/dumping/litter
20 Foot traffic/trampling
21 Improper burning regime
22 Over collecting/poaching
23 Erosion/runoff
24 Altered thermal regime
25 Landfill
26 Degrading water quality
27 Wood cutting
28 Military operations
29 Recreational use (non ORV)
30 Nest parasitism
31 Nonnative predators
32 Rip-rap, bank protection
33 Channelization (human caused)
34 Feral pigs
35 Burros
36 Rills
37 Phytogenic mounding

PARENT MATERIAL

ANDE	Andesite
ASHT	Ash (of any origin)
GRAN	Granitic (generic)
GREE	Greenstone
DIOR	Diorite
BASA	Basalt
OBSI	Obsidian
PUMI	Pumice
IGTU	Igneous (type unknown)
MONZ	Monzonite
PYFL	Pyroclastic flow
QUDI	Quartz diorite
RHYO	Rhyolite
VOLC	General volcanic extrusives
VOFL	Volcanic flow
VOMU	Volcanic mud
BLUE	Blue schist
CHER	Chert
DOLO	Dolomite
FRME	Franciscan melange
INTR	General igneous intrusives
GNBG	Gneiss/biotite gneiss
HORN	Hornfels
MARB	Marble
METU	Metamorphic (type unknown)
PHYL	Phyllite
SCHI	Schist
SESC	Semi-schist
SLAT	Slate
BREC	Breccia (non-volcanic)
CACO	Calcareous conglomerate
CASA	Calcareous sandstone
CASH	Calcareous shale
CASI	Calcareous siltstone
CONG	Conglomerate
FANG	Fanglomerate
GLTI	Glacial till, mixed origin, moraine
LALA	Large landslide (unconsolidated)
LIME	Limestone
SAND	Sandstone
SETU	Sedimentary (type unknown)
SHAL	Shale
SILT	Siltstone
DIAB	Diabase
GABB	Gabbro
PERI	Peridotite
SERP	Serpentine
ULTU	Ultramafic (type unknown)
CALU	Calcareous (origin unknown)
DUNE	Sand dunes
LOSS	Loess
MIIG	Mixed igneous
MIME	Mixed metamorphic
MIRT	Mix of two or more rock types
MISE	Mixed sedimentary
CLAL	Clayey alluvium
GRAL	Gravelly alluvium
MIAL	Mixed alluvium
SAAL	Sandy alluvium (most alluvial fans and washes)
SIAL	Silty alluvium
OTHE	Other than on list

SOIL TEXTURE

COSA	Coarse sand
MESN	Medium sand
FISN	Fine sand
COLS	Coarse, loamy sand
MELS	Medium to very fine, loamy sand
MCSL	Moderately coarse, sandy loam
MESA	Medium to very fine, sandy loam
MELO	Medium loam
MESIL	Medium silt loam
MESI	Medium silt
MFCL	Moderately fine clay loam
MFSA	Moderately fine sandy clay loam
MFSL	Moderately fine silty clay loam
FISA	Fine sandy clay
FISC	Fine silty clay
FICL	Fine clay
SAND	Sand (class unknown)
LOAM	Loam (class unknown)
CLAY	Clay (class unknown)
UNKN	Unknown

DOMINANT VEGETATION GROUP

Trees:

TBSE	Temperate broad-leaved seasonal evergreen forest
TNLE	Temperate or subpolar needle-leafed evergreen forest
CDF	Cold-deciduous forest
MNDF	Mixed needle-leafed evergreen-cold-deciduous. forest
TBEW	Temperate broad-leaved evergreen woodland
TNEW	Temperate or subpolar needle-leaved evergreen woodland
EXEW	Extremely xeromorphic evergreen woodland
CDW	Cold-deciduous woodland
EXDW	Extremely xeromorphic deciduous woodland
MBED	Mixed broad-leaved evergreen-cold-deciduous woodland
MNDW	Mixed needle-leafed evergreen-cold-deciduous woodland

Shrubs:

TBES	Temperate broad-leaved evergreen shrubland
NLES	Needle-leafed evergreen shrubland
MIES	Microphyllus evergreen shrubland
EXDS	Extremely xeromorphic deciduous shrubland
CDS	Cold-deciduous shrubland
MEDS	Mixed evergreen-deciduous shrubland
XMED	Extremely xeromorphic mixed evergreen-deciduous shrubland

Dwarf Shrubland:

NMED	Needle-leafed or microphyllous evergreen dwarf shrubland
XEDS	Extremely xeromorphic evergreen dwarf shrubland
DDDS	Drought-deciduous dwarf shrubland
MEDD	Mixed evergreen cold-deciduous dwarf shrubland

Herbaceous:

TSPG	Temperate or subpolar grassland
TGST	Temperate or subpolar grassland with sparse tree
TGSS	Temperate or subpolar grassland with sparse shrublayer
TGSD	Temperate or subpolar grassland with sparse dwarf shrub layer
TFV	Temperate or subpolar forb vegetation

THRV	Temperate or subpolar hydromorphic rooted vegetation
TAGF	Temperate or subpolar annual grassland or forb vegetation
***Sparse Vegetation*:**	
SVSD	Sparsely vegetated sand dunes
SVCS	Sparsely vegetated consolidated substrates

VEGETATION RAPID ASSESSMENT / RELEVE FIELD FORM

(Revised April 23, 2003--SAMO)

For Office Use:	Final database #:	Final vegetation type name:	Alliance Association

LOCATIONAL/ENVIRONMENTAL DESCRIPTION — **FinalAISCode:**

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:	InitialAISCode	FieldCrewCode

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (NAD 27)** _____ **Is GPS within stand?** Yes / No

If No cite: distance _____**m, secant/100 + / -** _____, **bearing** _____ **If RELEVE, center of plot?** Yes / No **Error: ±**_____ **ft/m**

UTM field reading: UTME __ __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ __ **UTM zone:** _____

Elevation: _____ **ft/m Photograph #'s**: _____

Topography: flat____ **concave**____ **convex**____ **undulating**____ | **bottom**____ **lower**____ **mid**____ **upper**____ **top**____

Geology: _____ **Soil Texture:** _____ **% Large Rock**_____ **% Small Rock**_____ **% Bare/Fines**_____

Slope exposure: **NE**_____ **SE**_____ **SW**_____ **NW**_____ **Flat**__ **Variable**__ **%Litter**_____

Slope steepness: 0°__ 1-5°____ 5-25°____ > 25°____ **Size of stand**: <1 acre___ 1-5 acres___ >5 acres ___ **Upland or Wetland**

Site history, stand age, and comments: _____

Type / level of disturbance (use codes): _____

VEGETATION DESCRIPTION

Field-assessed vegetation alliance name: _____

Field-assessed association name (optional): _____

Tree: T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)
If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.) **Desert Palm/Joshua Tree:** N/A **Desert Riparian Tree/Shrub:** N/A
% Overstory Conifer/Hardwood Tree cover: _____/_____ **Shrub cover:** _____ **Herbaceous cover:** _____ **Total Veg cover:**_____
Modal Conifer/Hardwood height: _____/_____ **Tall Shrub/Low Shrub height:** _____/_____ **Herbaceous height:** _____

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

Strata categories: T=tall, M=medium, L=low; **% cover** intervals for reference: **<1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%**

Strata	Species	% cover		Strata	Species	% cover

Major non-native species (with % cover): _____

Unusual species: _____

PROBLEMS WITH INTERPRETATION — **Bino Assessed Only? Yes / No**

Confidence in identification: (L, M, H) ID problems: _____

Polygon is more than one type: (Yes, No) _____ **Other types:** _____
Has the vegetation changed since air photo taken? (Yes, No) _____ **If Yes, how? What has changed** (write N/A if so)**?** _____

RELEVE INFO — **Plot Length (m)** _____ **Plot Width** _____ **If circle, diam** _____ **Plot Permanent? Y / N**

Representativeness of plot in stand: _____

Releve Protocol
Santa Monica Mtns NRA

June 11, 2003

This document is intended to provide general instructions and guidelines for conducting Releves at SAMO NRA. Parts have been adapted from the Yosemite Releve Protocol or CNPS Rapid Assessment Protocol. For SAMO NRA, the Releve has essentially become an in-depth Rapid Assessment. That is to say essentially the same information is gathered for a Rapid Assessment as for a Releve with the addition of a complete species list. The other main difference between the two protocols is that for Releves, the species list is compiled from within a defined area as opposed to the entire stand.

The same field form is used for both RA and Releve information. However, not all fields are required for both data types.

Establishing a Plot

1) Figure out where to place your plot. This is a subjective process. You'll want to place your plots in areas that seem to be both relatively **homogenous** and **representative** of the vegetation of the polygon as a whole. In other words, avoid areas where the vegetation appears to be transitioning from one type to another, and areas with anomalous or heterogeneous structure or species composition. Take some time to do this carefully, because the plots you set up may become *permanent*; relocated and resampled over time in order to determine responses to management, and other useful things. Look at *all* the vegetation strata to determine if the area is structurally and floristically uniform and generally try to place your plots a fair distance from what you see as the 'boundary' between this vegetation type and any neighboring, distinctly different types. However, the rule-of-thumb is to conduct a reconnaissance of the plot if time and topography allows.

Note: In cases where a polygon is very heterogeneous, more than one plot may be needed. Again, look around, use that human perception.

2) Take GPS information from CENTER of plot. Remember that this may become a permanent plot, so being able to *find* it again will be key: use the GPS, rather than estimating! (If you cannot get a GPS reading, estimate the coordinates from the topo map and note on the form that you had to resort to this method.)

Note: You can deviate from the standard plot *shapes* where that makes sense, but the total plot *area* encompassed by the boundaries should be as listed above for each major class of vegetation. For example, forested riparian vegetation, may be sampled in a more linear, 10 x 100 m (1000 m^2) plot; herbaceous riparian or ridgeline vegetation in a 2 x 50 m (100 m^2) plot.

Standard plot sizes

If you're in a ...	You should make your plot...	Giving you a plot area of...
Forest (trees have their crowns overlapping, usually forming 60-100% cover)	20 m x 50 m	1000 m^2
Woodland (open stands of trees with crowns usually not touching. Canopy tree cover is 25-60% Or exceeds shrub, dwarf-shrub, herb, and nonvascular cover).	20 m x 50 m	1000 m^2
Shrubland (shrubs greater than 0.5 m tall are dominant, usually forming more than 25% cover OR exceeding tree, dwarf-shrub, herb, and nonvascular cover)	20 m x 20 m	400 m^2
Dwarf-shrubland (shrubs less than 0.5 m tall are dominant, usually forming more than 25% cover OR exceeding tree, shrub, herb, and nonvascular cover).	20 m x 20 m	400 m^2
Herbaceous (herbs dominant, usually forming more than 25% cover OR exceeding tree, shrub, dwarf-shrub, and nonvascular cover).	10 m x 10 m	100 m^2
Nonvascular (nonvascular cover dominant, usually forming more than 25% cover).	5 m x 5 m	25 m^2

Notes on Compiling Species list:

As you begin to collect the species, DBH, and cover information on page two, keep these four rules in mind—they will speed your data collection considerably:

1) If there are more than 25 trees over 10 cm DBH, measure a representative quarter of the plot (this may be any portion of the plot but should be 25% of the total plot area. CLEARLY NOTE on the form where this sub-sample was taken. Also, remember that DBH is an inherently inexact measurement (your 'breast height may be very different from the next ecologist's for one thing), so don't fret over this one—this should be a quick measurement!

2) Except in very diverse plots, don't spend more than **20 minutes** looking for new and different species to record. Remember that these plot data are to be used to classify the overall vegetation of the Park, not to make a complete species list for it. And if you had to spend much more than 20 minutes to *find* a species, it probably isn't going to be important in characterizing the vegetation type. For diverse plots with over 25 taxa you may take up to 30 minutes on the listing process.

3) We have asked you to estimate in cover classes, but often it is helpful to make and attempt to estimate an actual percent cover for certain species. This may be useful in getting a sense of total vegetation cover (by adding percentages) and in determining to which category a species that is a

borderline between two cover classes should be assigned. Try not to agonize over the percent cover column. This is only a rough visual estimate.

4) If you can't identify a plant to species, record the species on your form as "unknown species 1," "unknown species 2," "Carex unknown sp. 1," etC. Record cover class and other data for the unknown as you would for any other species.

If you need the species identified right away because it appears to be dominant or diagnostic (you're seeing it all over the place or you're seeing much more in this particular vegetation type than in others), take a sample of the species with as much of the plant as possible, especially intact sexual parts, if present. Place the sample in a baggie, and label the baggie with the plot code and the name you gave it on the data form. On an office day, take the time to key the plant out. If unable to get a definite ID, bag the plant and give it to the Inventory and Monitoring Botanist or send it to the UCLA herbarium curator.

Definitions of fields in the protocol

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling. If it is a polygon that AIS has requested information on, assign it the AIS number given on the In-house Field Map. If AIS has not requested information on the polygon (no AIS number to be assigned), use the next sequential number from your team's list of Releve numbers. Also be sure to label the location on paper copy of the photo overlay.

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photointerpreters have already done photointerpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank.

Date: Date of the sampling.

Name(s) of surveyors: The full names of each person assisting should be provided for their first rapid assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

Initial AIS Code: 4-digit mapping classification code assigned by AIS at time of initial interpretation.

Field Crew Code: 4-digit code mapping classification code assigned by Field crew upon completion of form. This should correspond as closely as possible to the Field Alliance and Association Name (see below).

GPS waypoint #: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS name: The name personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (NAD 27) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects as well as SAMO projects is NAD 27. Please circle NAD27 or write in the appropriate datum.

Is GPS within stand? Yes / No Circle"Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand). For Releves, there is an additional field "If RELEVE, center of plot?". Be sure to describe location of the point if not taken at center.

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g.* binoculars, aerial photo).

If Releve, Center of plot? Yes/No If the plot being gathered is a releve, was the GPS point taken at the center of the releve? If it is not in the center, describe the location in the notes section.

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location, because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record UTMs using a GPS unit (preferred) or In-House Topographic Field Maps.

UTM zone: Universal Transverse Mercator zone. Zone is 11 for all of SAMO.

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

Photograph #'s: Note the roll number, frame number, direction, and the name of the person whose camera is being used. Take at least two photographs from different directions, and describe the location and view direction from compass bearings for each frame. Additional photographs of the stand may also be helpful.

Topography: Check two of the provided features, characterizing both the local relief and the broad topographic position of the area. First assess the minor topographic features or the lay of the area (*e.g.* surface is flat, concave, etc.). Then assess the broad topographic feature or general position of the area (*e.g.* stand is at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top). . In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

Geology: Geological parent material of site. If exact type is unknown, use a more general category (*e.g.* igneous, metamorphic, and sedimentary). *See code list for types.*

Soil: Record soil texture or series that is characteristic of the site (*e.g.* sand, silt, clay, coarse loamy sand, sandy clay loam, saline, etc.). *See soil texture key and code list for types.*

% Large Rock (optional): Estimate the percent surface cover of large rocks (e.g. stones, boulders, bedrock) that are beyond 25 cm in size.

% Small Rock (optional): Estimate the percent surface cover of small rocks (e.g. gravel, cobbles) that are greater than 2 mm and less than 25 cm in size.

% Bare/Fines (optional): Estimate the percent surface cover of bare ground and fine sediment (e.g. dirt) that is 2 mm or less in size.

% Litter (optional): Estimate the percent surface cover of organic litter.

General slope exposures (circle one and enter actual º): Read degree aspect from a compass (or estimate), using degrees from true north (adjusting for declination). Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

General slope steepness (circle one and enter actual º): Read degree slope from compass or clinometer (or estimate). Average the reading over entire stand. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

Upland or Wetland (circle one): Indicate if the stand is an upland or a wetland; note that a site need not be officially delineated as a wetland to qualify as such in this context (*e.g.* seasonally wet meadow).

Site history, stand age, and comments: Briefly describe the stand age/serial stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

Type / level of disturbance (use codes): List codes for potential or existing impacts on the stability of the plant community. Characterize each impact each as L (=Light), M (=Moderate), or H (=Heavy). *See code list for impacts.*

VEGETATION DESCRIPTION

Basic alliance and stand description.

Field-assessed vegetation alliance name: Name of alliance (series) or habitat following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g. Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Please note: The field-assessed alliance name may not exist in present classification, in which you can provide a new alliance name in this field.

Field-assessed association name (optional): Name of the species in the alliance and additional dominant/diagnostic species from any strata, as according to CNPS classification. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (*e.g. Quercus agrifolia/Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (*e.g. Quercus agrifolia-Quercus kelloggii)*.

Please note: The field-assessed association name may not exist in present classification, in which you can provide a new association name in this field.

Size of stand: Estimate the size of the entire stand in which the rapid assessment is taken. As a measure, one acre is about 0.4 hectares or about 4000 square meters.

Number of encounters of this alliance (tally/circle once): This estimate can be done for a landscape-level project of a general area, ecological subsection, watershed, etc., though it is not required. Make an estimate of the total number of times that this alliance was seen in the project survey and recorded on field forms.

Please note: This estimation should only be done once, at the end of a project survey, for every alliance identified in the field. Please provide the tally once for each alliance, and provide the estimate on the first rapid assessment field form that was filled out for each alliance.

Habitat classification per California Wildlife-Habitat Relationships (CWHR)

For CWHR, identify the size/height class of the stand using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

Tree: Circle one of the tree size classes provided when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Size class is based on the average dbh (diameter of trunk at breast height). In choosing a size class, make sure to estimate the mean diameter of all trees over the entire stand. Circle the size class 6 multi-layered tree if there is a size class 5 of trees over a distinct layer of size class either 3 or 4 (*i.e.,* distinct height class separation between different tree species) and the total tree canopy exceeds 60%.

If tree, list 1-3 dominant overstory species: If tree canopy cover exceeds 10 percent (except in desert types), please list the dominant species that occur in the overstory canopy.

Shrub: Circle one of the shrub size classes provided when shrub canopy closure exceeds 10 percent (except in desert types). Size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

Herbaceous: Circle one of the herb height classes provided when herbaceous cover exceeds 2 percent. This height class is based on the average plant height at maturity.

Desert Palm/Joshua Tree: Circle one of the palm or Joshua tree size classes by averaging all the stem-base diameters (*i.e.,* mean diameter of all stem-base sizes). Diameter is measured at the plant's base above the bulge near the ground.

Desert Riparian Tree/Shrub: Circle one of the size classes by measuring mean stem height (whether tree and/or shrub stand).

Overall cover of vegetation

Provide an ocular estimate of cover for the following categories (based on functional life forms). Record a specific number for the total aerial cover or "bird's-eye view" looking from above for each

category, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

To come up with a specific number estimate for percent cover, first use to the following CWHR cover intervals as a reference aid to get a generalized cover estimate: <2%, 2-9%, 10-24%, 25-39%, 40-59%, 60-100%. While keeping these intervals in mind, you can then refine your estimate to a specific percentage for each category below.

%Overstory Conifer/Hardwood Tree cover: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Shrub cover: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs.

Ground cover: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs.

Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers.

Modal height for conifer/hardwood tree, shrub, and herbaceous categories (optional)
If height values are important in your vegetation survey project, provide an ocular estimate of height for each category listed. Record an average height value, estimating the modal height for each group. Use the following height intervals and record a height class: 01=<1/2m, 02=1/2-1m, 03=1-2m, 04=2-5m, 05=5-10m, 06=10-15m, 07=15-20m, 08=20-35m, 09=35-50m, 10=>50m.

Species list and coverage: This Section should be skipped when performing a Releve. An extended table is provided on the back of the sheet.

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please) **Major nonnative species in stand (with % cover), Unusual species.** If using form for a releve, this information is filled out in a separate table. See Releve Info below.

PROBLEMS WITH INTERPRETATION

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this

alliance name. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Other identification problems (describe): Discuss any further problems with the identification of the assessment (*e.g.* stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

Polygon is more than one type (Yes, No) (Note: type with greatest coverage in polygon should be entered in above section) This is relevant to areas that have been delineated as polygons on aerial photographs for a vegetation-mapping project. In most cases the polygon delineated is intended to represent a single stand, however mapping conventions and the constraints and interpretability of remote images will alter the ability to map actual stands on the ground. "Yes" is noted when the polygon delineated contains the field-assessed alliance and other vegetation type(s), as based on species composition and structure. "No" is noted when the polygon is primarily representative of the field-assessed alliance.

Other types: If "Yes" above, then list the other subordinate vegetation alliances that are included within the polygon. List them in order of their amount of the polygon covered.

Has the vegetation changed since air photo taken? (Yes, No) If an aerial photograph is being used for reference, evaluate if the stand of the field-assessed alliance has changed as a result of disturbance or other historic change since the photograph was taken.

If Yes, how? What has changed (write N/A if so)**?** If the photographic signature of the vegetation has changed (*e.g.* in structure, density, or extent), please detail here.

RELEVE INFO: This section is only for Releve use.

Plot Length (m): Record the long axis of the Releve plot in meters.

Plot Width: Record the short axis of the Releve plot in meters.

If circle, diam: If the Releve plot is a circle, record the diameter in meters.

Plot Permanent? If the Releve plot is marked permanently with rebar, etc, circle Y (yes).

Representativeness of plot in stand: Does this plot represent the full variability of the polygon? If not, were additional plots taken? Note additional species not seen in plot in the space provided below. You may also include notes about how this polygon compares to others you have seen of similar type.

Species Table (Releve)

This is found on the backside of the form. At the top of the page, be sure to fill out polygon/stand #, Air photo, and the number of pages the species list is on. List the species that are dominant or that are characteristically consistent throughout the plot.

When different layers of vegetation occur in the plot, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum. Check a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height. Note that you may list the same species in more than one strata, based on the maximum height of the individuals, thus, those canopy tree-sized individuals should only be listed in the canopy tree category and those herb-size individuals should only be listed in the H layer.

For plots with trees, list the DBH (in cm) of all trees above 10 cm diameter (this would include each stem from a multi-stemmed tree). Separate the measurements with a comma. For plots with very high tree density DBH measurements will be done in a subplot. If the number of trees with a DBH greater than 10 cm is more than about 25, divide the plot into quarters and measure the DBH of trees in the most representative quadrant. CLEARLY NOTE on the form that this is what you've done.

Provide a numerical ocular estimate of aerial coverage for each species. When estimating, it is often helpful to think of coverage in terms of the cover intervals (see below). Record the cover class, and then refine your estimate to a specific percentage (*e.g.* the cover of species "x" is somewhere between 25 and 50 percent, but I think it is actually around 30%). Please note: All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Cover Scale for Species Percent Cover

Code	Range of Class	Class midpoint
01	>0-1%	0.5%
02	1-5%	3%
03	5-25%	15%
04	25-50%	37.5%
05	50-75%	62.5%
06	75-100	87.5%

VEGETATION RAPID ASSESSMENT / RELEVE FIELD FORM

(Revised April 23, 2003--SAMO)

For Office Use:	Final database #:	Final vegetation type name:	Alliance Association

LOCATIONAL/ENVIRONMENTAL DESCRIPTION — FinalAISCode:

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:	InitialAISCode	FieldCrewCode

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (NAD 27)** _____ **Is GPS within stand?** Yes / No

If No cite: distance _____**m, secant/100 + / -** _____, **bearing** _____ **If RELEVE, center of plot?** Yes / No **Error: ±**_____ **ft/m**

UTM field reading: UTME ___ ___ ___ ___ ___ ___ **UTMN** ___ ___ ___ ___ ___ ___ **UTM zone:** _____

Elevation: _____ **ft/m Photograph #'s**: _____

Topography: flat____ **concave**____ **convex**____ **undulating**____ | **bottom**____ **lower**____ **mid**____ **upper**____ **top**____

Geology: _____ **Soil Texture:** _____ **% Large Rock**_____ **% Small Rock**_____ **% Bare/Fines**_____

Slope exposure: **NE**_____ **SE**_____ **SW**_____ **NW**_____ **Flat**__ **Variable**__ **%Litter**_____

Slope steepness: 0°__ 1-5°____ 5-25°____ > 25°____ **Size of stand**: <1 acre___ 1-5 acres___ >5 acres ___ **Upland or Wetland**

Site history, stand age, and comments: _____

Type / level of disturbance (use codes): _____

VEGETATION DESCRIPTION

Field-assessed vegetation alliance name: _____

Field-assessed association name (optional): _____

Tree: T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)
If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.) **Desert Palm/Joshua Tree:** N/A **Desert Riparian Tree/Shrub:** N/A
% Overstory Conifer/Hardwood Tree cover: _____/_____ **Shrub cover:** _____ **Herbaceous cover:** _____ **Total Veg cover:**_____
Modal Conifer/Hardwood height: _____/_____ **Tall Shrub/Low Shrub height:** _____/_____ **Herbaceous height:** _____

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

Strata categories: T=tall, M=medium, L=low; **% cover** intervals for reference**: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%**

Strata	Species	% cover		Strata	Species	% cover

Major non-native species (with % cover): _____

Unusual species: _____

PROBLEMS WITH INTERPRETATION — **Bino Assessed Only? Yes / No**

Confidence in identification: (L, M, H) ID problems: _____

Polygon is more than one type: (Yes, No) _____ **Other types:** _____
Has the vegetation changed since air photo taken? (Yes, No) _____ **If Yes, how? What has changed** (write N/A if so)**?** _____

RELEVE INFO **Plot Length (m)** _____ **Plot Width** _____ **If circle, diam** _____ **Plot Permanent? Y / N**

Representativeness of plot in stand: _____

Releve Polygon/Stand # _____ ***Air Photo*** _____ **Species List** Page_____ of _____

SANTA MONICA Mountains VEGETATION MAPPING SPECIES INFORMATION

Cover Class Intervals: 1 (<1%), 2 (1-5%), 3 (>5-25%), 4 (>25-50%), 5 (>50-75%), 6 (>75%)

L	M	T	Vascular plant name or moss/lichen cryptogamic crust cover	DBH of all trees > 10 cm.	Cover Class	%

Total Vegetation Cover (Class/%): ____/_____ Total Nonnative (Class/%) _____/_____

Accuracy Assessment Protocol
Santa Monica Mountains NRA

Updated: August 11, 2004

Accuracy Assessments (AAs) are gathered to assess the accuracy and calibration level of the mapping units assigned to each polygon. AAs focus on the drawn polygon more than the actual stand.

Choose stands of which you have a good, representative view. Do not choose to AA a polygon that you can only see part of or ones that seem to be transitional. AAs need to be representative of all the diversity of mapped vegetation units in the entire mapping area, much like Rapid Assessments and Releves. A regularly-updated tracking matrix will be provided to the field crews to help insure spread of AAs across SAMO mapping area.

Definitions of Data Fields:

IDENTIFIERS/LOCATORS

Field Point Number: Number assigned to polygon. Each team has been provided with a list of consecutive numbers to be assigned to AA point. Select the next available number and be sure to label the location on the paper copy of the field overlay.

Air Photo: The number given to the aerial photo in a vegetation-mapping project.

Date: Date of the sampling.

Surveyors: The full names of each person assisting should be provided for their first accuracy assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

Park Site Name: Provisional name assigned by field worker that describes where the data were collected. It should represent an identifiable feature on a topographic map.

Quad Code: Appropriate name/scale from survey map used; use 7.5-minute quadrangle if possible. May often be found on photo overlay.

Primary Veg Assoc Name: Using the Vegetation Type Classification Key, assign the best-fitting Association name. Also record the 4-digit mapping code. If Classification Key is not completed, record best guess under Classification Comments.

Secondary Veg Assoc Name: Using the Vegetation Type Classification Key, assign the second-best-fitting Association name. Also record the 4-digit mapping code. If Classification Key is not completed, record best guess under Classification Comments.

Other Veg Assocs within 50m: Record the direction/location and the names of vegetation associations within 50 meters of polygon, as you see them onsite. This is used to double-check location of polygon surveyed.

Classification Comments: Does it key easily using the Vegetation Type Classification Key? Are all diagnostic species present in proper proportions? In not, how do they differ?

GPS File Name: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS Unit: The name personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (NAD 27) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects as well as SAMO projects is NAD 27. Please circle NAD27 or write in the appropriate datum.

Is GPS within stand? Yes / No Circle"Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand).

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g.* binoculars, aerial photo).

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record UTMs from a GPS unit (preferred) or In-House Topographic Field Maps.

UTM zone: Universal Transverse Mercator zone. Zone is 11 for all of SAMO.

Corrected UTM: Not to be filled out in field.

ENVIRONMENTAL DESCRIPTION

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

General slope exposures (circle one and enter actual º): Read degree aspect from a compass (or estimate) using degrees from true north (adjusting for declination).. Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

General slope steepness (circle one and enter actual º): Read degree slope from compass or clinometer (or estimate), Average the reading over entire stand.

Topography: Check two of the provided features, characterizing both the local relief and the broad topographic position of the area. First assess the minor topographic features or the lay of the area (*e.g.* surface is flat, concave, etc.). Then assess the broad topographic feature or general position of the area (*e.g.* stand is at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top).

Environmental Comments: Include comments on hydrology and fire history. Has the vegetation in polygon changed since photos?

Unvegetated Surface: Use the cover scale below to record % cover of Large rocks, Small rocks, Bare/Fine, Litter.

VEGETATION DESCRIPTION

Leaf phenology (of dominant stratum): Select the value which best describes the leaf phenology of the dominant stratum. The dominant stratum is the uppermost stratum that contains at least 10% cover.

EVERGREEN - Greater than 75% of the total woody cover is never without green foliage.

COLD-DECIDUOUS - Greater than 75% of the total woody cover sheds its foliage in connection with an unfavorable season mainly characterized by winter frost.

DROUGHT DECIDUOUS - Greater than 75% of the total woody cover sheds its foliage in connection with an unfavorable season mainly characterized by drought.

MIXED EVERGREEN - COLD-DECIDUOUS - Evergreen and deciduous species generally contribute 25-75% of the total woody cover. Evergreen and cold-deciduous species admixed.

MIXED EVERGREEN - DROUGHT DECIDUOUS - Evergreen and deciduous species generally contribute 25-75% of the total woody cover. Evergreen and drought-deciduous species admixed.

PERENNIAL - Herbaceous vegetation composed of more than 50% perennial species.

ANNUAL - Herbaceous vegetation composed of more than 50% annual species.

Leaf Type: Select one value which best describes the leaf form of the dominant stratum. The dominant stratum is the uppermost stratum that contains at least 10% cover.

BROAD-LEAVED - Woody vegetation primarily broad-leaved (generally contributes greater than 50 percent of the total woody cover).

NEEDLE-LEAVED - Woody vegetation primarily needle-leaved (generally contributes greater than 50 percent cover).

MICROPHYLLOUS - Woody cover primarily microphyllous.

GRAMINOID - Herbaceous vegetation composed of more than 50 percent graminoid/stipe leaf species.

FORB (BROAD-LEAF-HERBACEOUS) - Herbaceous vegetation composed of more than 50% broad-leaf forb species.

PTERIDOPHYTE - Herbaceous vegetation composed of more than 50 percent species with frond or frond-like leaves.

PHYSIOGNOMIC CLASS CHOOSE ONE:

FOREST: Trees with their crowns overlapping (generally forming 60-100% cover).

WOODLAND: Open stands of trees with crowns not usually touching (generally forming 25-60% cover). Canopy tree cover may be less than 25% in cases where it exceeds shrub, dwarf-shrub, herb, and nonvascular cover, respectively.

SHRUBLAND: Shrubs generally greater than 0.5 m tall with individuals or clumps overlapping to not touching (generally forming more than 25% cover, trees generally less than 25% cover). Shrub cover may be less than 25% where it exceeds tree, dwarf-shrub, herb, and nonvascular cover, respectively. Vegetation dominated by woody vines is generally treated in this class.

DWARF-SHRUBLAND: Low-growing shrubs usually under 0.5 m tall. Individuals or clumps overlapping to not touching (generally forming more than 25% cover, trees and tall shrubs generally less than 25% cover). Dwarf-shrub cover may be less than 25% where it exceeds tree, shrub, herb, and nonvascular cover, respectively.

HERBACEOUS: Herbs (graminoids, forbs, and ferns) dominant (generally forming at least 25% cover; trees, shrubs, and dwarf-shrubs generally with less than 25% cover). Herb cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and nonvascular cover, respectively.

NONVASCULAR: Nonvascular cover (bryophytes, non-crustose lichens, and algae) dominant (generally forming at least 25% cover). Nonvascular cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and herb cover, respectively.

SPARSE VEGETATION: Abiotic substrate features dominant. Vegetation is scattered to nearly absent and generally restricted to areas of concentrated resources (total vegetation cover is typically less than 25% and greater than 0%).

Strata/Lifeform, Height, Cover, Diagnostic Species: Visually divide the community into vegetation layers (strata). Indicate the average height class of the stratum in the first column, using the Height Scale on the form. Enter the average percent cover class of the whole stratum in the second column, using the Cover Scale on the form. Height and Cover classes are also listed below.

List the *dominant* species and individual cover classes in each stratum. If species known to be diagnostic of a particular vegetation type are present, list these as well, marking them with an asterisk. Only note species of the dominant vegetation type. *Do not list species found in inclusions* (small patches in polygon of different vegetation types).

Note: All AA's collected before August 11, 2004, included all species found in inclusions in the species list in an effort to describe the entire mapping polygon.

Heterogeneity: Choose the one that best describes the heterogeneity of the polygon.

HOMOGENEOUS: a map unit with at least 85% of the area composed of a homogenous condition of vegetation (at the appropriate level in the classification hierarchy) or dominance types

COMPOSED OF SIMILAR TYPES: a map unit composed of a grouping of vegetation or dominance types (at the appropriate level in the classification hierarchy) with similar taxonomic composition and physiognomy. For example, a complex of scrub oak pure and scrub oak - interior oak patterns something different at the fine scale but is closely related in the vegetation classification.

COMPOSED OF DISSIMILAR TYPES: a map unit composed of a grouping of dissimilar vegetation types (at the appropriate level in the classification hierarchy) that are spatially and ecologically related on the landscape. For example, a small herbland and adjacent rock outcroppings complexing in a small area.

Inclusions: List the vegetation type of any inclusions found within the mapping polygon and the percent of the polygon composed of them. Additional descriptions of the inclusions such as location can be entered under *AA Comments*.

Cover Scale 1:

01	0-5%
02	>5-10%
03	>10-20%
04	>20-30%
05	>30-40%
06	>40-50%
07	>50-60%
08	>60-70%
09	>70-80%
10	>80-90%
11	>90-100%

Height Scale:

01	<0.5 m
02	0.5-1 m
03	1-2 m
04	2-5 m
05	5-10 m
06	10-15 m
07	15-20 m
08	20-35 m
09	35-50 m
10	>50 m

Cover Scale 2:

01	<1%
02	1-5%
03	>5-15%
04	>15-25%
05	>25-50%
06	>50-75%
07	>75-100%
00	0

Cover Scale 1 was used for all parts of the AA from the start of the project until August 30, 2004. It continues to be used for cover of unvegetated surface.

Cover Scale 2 was implemented for strata and species covers on August 30, 2004.

AA Comments: Describe polygon heterogeneity. How much of polygon was assessed? Certainty of AA?

Database Code _____ **Initial AIS** _____

PARK VEGETATION MAPPING PROGRAM: **ACCURACY ASSESSMENT** POINT FORM

IDENTIFIERS/LOCATORS Updated 12 August 2005

Field Point Number_____ Air Photo _____ Date_____ Surveyors_____

State CA Park Name Santa Monica Mtns. Park Site Name _____ Quad _____ Region ____

Primary Veg Assoc Name _____ Code_____

Secondary Veg Assoc Name_____ Code_____

Other Veg Assocs within 50 m _____

_____

Classification Comments: (does it key easily? Are all diagnostic species present in proper proportions? If not how does it differ?)

GPS File name_____ GPS Unit_____ GPS datum: (WGS 84)_____ GPS in Stand? Yes / No

Field UTME___ ___ ___ ___ ___ ___ m X Field UTMN___ ___ ___ ___ ___ ___ ___ m Y UTM Zone__11___

If not is stand: Distance (m) _____ Secant reading+/-_____ Compass bearing_____ GPS Error _____ ft / m

*Corrected UTM X*___ ___ ___ ___ ___ ___ *m Corrected UTM Y*___ ___ ___ ___ ___ ___ ___ *m N*

ENVIRONMENTAL DESCRIPTION

Elevation _____ft/m Slope exposure: NE_____ SE_____ SW_____ NW_____ Flat__ Variable__

Slope steepness: 0º__ 1-5º ____ 5-25º____ > 25º____

Topography: flat____ concave____ convex____ undulating____ | bottom____ lower____ mid____ upper____ top____

Environmental Comments (including hydrology, fire history)

Veg Changed since photo? Yes / No How?_____

Unvegetated Surface: *(please use the cover scale below)*

___ Large rocks (cobbles, boulders > 10 cm)
___ Small rocks (gravel, 0.2-10 cm)
___ Bare/Fine
___ Litter

VEGETATION DESCRIPTION

Leaf phenology (of dominant stratum)

Trees and Shrubs
___1 Evergreen
___2 Cold-deciduous
___3Drought-deciduous
___4 Mixed evergreen - cold-deciduous
___5 Mixed evergreen - drought-deciduous

Herbs
___1 Annual
___2 Perennial

Leaf Type (of dominant stratum)

___1 Broad-leaved
___2 Needle-leaved
___3 Mixed broad-leaved/Needle leaved
___4 Microphyllous
___5 Graminoid
___6 Forb
___7 Pteridophyte

Physiognomic class

___1 Forest
___2 Woodland
___3 Shrubland
___4 Dwarf Shrubland
___5 Herbaceous
___6 Nonvascular
___7 Sparsely Vegetated

Cover Scale for Unvegetated Surface

01	0-5%
02	>5-10%
03	>10-20%
04	>20-30%
05	>30-40%
06	>40-50%
07	>50-60%
08	>60-70%
09	>70-80%
10	>80-90%
11	>90-100%

Strata	Height	Cover Class/%	(mark any known diagnostic species with a *) Dominant Spp.	%cover	CvrCls	Dominant Spp.	%cover	CvrCls
T1 **Emergent**	_____	___/___						
T2 **Canopy**	_____	___/___						
T3 **Sub-canopy**	_____	___/___						
S1 **Tall shrub**	_____	___/___						
S2 **Short Shrub**	_____	___/___						
S3 **Dwarf-shrub**	_____	___/___						
H **Herbaceous**	_____	___/___						
N **Non-vascular**	_____	___/___						
V **Vine/liana**	_____	___/___						
E **Epiphyte**	_____	___/___						

Heterogeneity: Polygon is generally

_____ 1 Homogeneous (>85% 1 type)

_____ 2 Composed of similar types
(similar taxonomic composition and physiognomy)

_____ 3 Composed of dissimilar types

Inclusions: Other types in polygon (not included in species list) % of polygon

Cover Scale: Strata and Species		Height Scale: Strata	
01	<1%	01	<0.5 m
02	1-5%	02	0.5-1 m
03	>5-15%	03	1-2 m
04	>15-25%	04	2-5 m
05	>25-50%	05	5-10 m
06	>50-75%	06	10-15 m
07	>75-100%	07	15-20 m
00	0	08	20-35 m
CC scale changed August 30, 2004		09	35-50 m
		10	>50 m

AA Comments (Further describe polygon heterogeneity; how much polygon assessed?; aa certainty?)

Observation Protocol
Santa Monica Mountains NRA

June 11, 2003

The observation form has been developed as a way to efficiently provide photointerpretors with basic information on specified polygons. The photointerpretors do not always need the complete information of a Rapid Assessment but rather a quick confirmation or check of a photo signature. This form in combination with the Priority Categories listed below significantly speeds and focuses data collection.

The use of this form is up to the discretion of the field crew. If you feel the additional information in an RA would be very helpful to AIS, perform an RA. *Crews do not have to fill out form completely for each polygon* depending information needed and how close AIS is to correct code.

Remember to label these on the RA sheets so that other teams know information has already been gathered there.

Definitions of Data Fields

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photointerpreters have already done photointerpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank. Data from only one air photo should be recorded on the same observation sheet.

Date(s): Date(s) of the sampling.

Name(s) of surveyors: Initials of each person assisting can be recorded.

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling.

Initial AIS Code: 4-digit mapping classification code assigned by AIS at time of initial interpretation.

Field Crew Code: 4-digit code mapping classification code assigned by Field crew upon completion of form. This should correspond as closely as possible to the Field Alliance and Association Name (see below).

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this alliance name. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Problems (describe): Discuss any further problems with the identification of the assessment (*e.g.* stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

General slope exposures (circle one and enter actual º): Read degree aspect from a compass (or estimate), using degrees from true north (adjusting for declination). Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

General slope steepness (circle one and enter actual º): Read degree slope from compass or clinometer (or estimate). Average the reading over entire stand. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.
Bino Assessed Only? (circle one): If the polygon was only viewed through binoculars and was not entered into, circle yes.

Site history, stand age, and comments: Briefly describe the stand age/serial stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Also include any other notes that may be of help to photointerpretors.

Field-assessed alliance/association: Name of alliance (series) or association following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g.* *Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Please note: The field-assessed alliance or assocation name may not exist in present classification, in which you can provide a new alliance name in this field.

%Overstory Conifer/Hardwood Tree cover: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Shrub cover: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs.

Ground cover: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs.

Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers.

Species list and coverage

Species (List up to 6 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

List the species that are dominant or that are characteristically consistent throughout the stand.

When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum. Provide a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height.

Also, provide a numerical ocular estimate of aerial coverage for each species. All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Other Notes: At bottom of the form, record additional notes about specific polygons or about photo in general. For example: There is no *Malosma laurina* in area, only *Rhus ovata*.

Observation Form---SAMO

Air Photo_____ Date(s)_____ Surveyors_____

Polygon/Stand #:	InitialAISCode	FieldCrewCode	Confidence in identification: (L, M, H) _____ Problems: _____

Topography: flat__ concave__ convex__ undulating__ | bottom__ lower__ mid__ upper__ top__

Slope exposure: **Actual_____ Flat__ Variable__ Slope steepness : 0°__ 1-5°_____ 5-25°_____ > 25°_____**

Bino Assessed Only? Yes/No **Site comments:** _____

Field-assessed alliance/association: _____

% Overstory Conifer/Hardwood Tree cover: _____/_____ Shrub cover: _____ Herbaceous cover: _____ Total Veg cover:_____

Strata	Species	% cover		Strata	Species	% cover

Other Notes: _____

Polygon/Stand #:	InitialAISCode	FieldCrewCode	Confidence in identification: (L, M, H) _____ Problems: _____

Topography: flat__ concave__ convex__ undulating__ | bottom__ lower__ mid__ upper__ top__

Slope exposure: **Actual_____ Flat__ Variable__ Slope steepness : 0°__ 1-5°_____ 5-25°_____ > 25°_____**

Bino Assessed Only? Yes/No **Site comments:** _____

Field-assessed alliance/association: _____

% Overstory Conifer/Hardwood Tree cover: _____/_____ Shrub cover: _____ Herbaceous cover: _____ Total Veg cover:_____

Strata	Species	% cover		Strata	Species	% cover

Polygon/Stand #:	InitialAISCode	FieldCrewCode	Confidence in identification: (L, M, H) _____ Problems: _____

Topography: flat__ concave__ convex__ undulating__ | bottom__ lower__ mid__ upper__ top__

Slope exposure: **Actual_____ Flat__ Variable__ Slope steepness : 0°__ 1-5°_____ 5-25°_____ > 25°_____**

Bino Assessed Only? Yes/No **Site comments:** _____

Field-assessed alliance/association: _____

% Overstory Conifer/Hardwood Tree cover: _____/_____ Shrub cover: _____ Herbaceous cover: _____ Total Veg cover:_____

Strata	Species	% cover		Strata	Species	% cover